C 11

Prof. R.C. McRea

THE WAGES OF UNSKILLED LABOR IN MANUFACTURING INDUSTRIES IN THE UNITED STATES, 1890–1924

STANFORD UNIVERSITY LIBRARY
APR 1 1927

BY

WHITNEY COOMBS, M. A.

Assistant Professor of Economics
Allegheny College

IR.

~~LIBRARY~~
~~SCHOOL OF BUSINESS~~

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF DOCTOR OF PHILOSOPHY
IN THE
FACULTY OF POLITICAL SCIENCE
COLUMBIA UNIVERSITY

STANFORD UNIVERSITY LIBRARIES
WITHDRAWN

NEW YORK
1926

781
.72C
UNCLASSED
Dissertation

THE WAGES OF UNSKILLED LABOR IN MANUFACTURING INDUSTRIES IN THE UNITED STATES, 1890–1924

BY

WHITNEY COOMBS, M. A.

Assistant Professor of Economics
Allegheny College

LIBRARY
SCHOOL OF BUSINESS

UBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF DOCTOR OF PHILOSOPHY
IN THE
FACULTY OF POLITICAL SCIENCE
COLUMBIA UNIVERSITY

NEW YORK
1926

Copyright, 1926

by

WHITNEY COOMBS

PRINTED IN THE UNITED STATES OF AMERICA

PREFACE

In undertaking this study of the wages of unskilled labor there were two objects that I hoped to achieve. The first of these was the obvious one of securing a reliable quantitative means of measuring the variations in the wages of an important group of workers in the manufacturing industries of the United States. So many of the economic and social problems of the day hinge on, or are closely related to, wage conditions that any light on the problem not only is of value in itself, but also may make possible the extension of knowledge in collateral fields. The particular group with which I have been concerned in the study presents problems that are more difficult of solution than those that are presented by higher skilled employees in manufacturing, or indeed by almost any other group of workers.

The second objective that I hoped to achieve was based on the belief that the raw material necessary for the successful quantitative analysis of my particular problem and of a number of similar ones existed and that failure to utilize it involved both the loss of whatever light such utilization might throw on the problems involved and of most of the work and expense of the collection of the original data. More careful research into the mass of wage data that exist, particularly that have been collected by various governmental bodies, reveals the fact that the study of variations of wages in many fields over considerable periods of years is possible. Previous work in the field has neither exhausted the material nor drawn from it all the information that it contains. My work in the pages that follow is an attempt to gather

the data that concern unskilled labor. Numerous difficulties in fitting together the sets of data that exist will be found in this and in any other study that may be attempted. To a considerable extent such difficulties may be surmounted. Regularity in the collection and presentation of such data that are to be provided in the future should become the aim of the federal and State bureaus collecting labor or other statistics. The appreciation of this is governing more and more the work of those in charge of such collection. Until ideal statistics are available, however, there seems no reason for not attempting the examination and combination of the data which we have with the idea of securing from them all the information that is possible. Justification for such procedure may be found in the pages that follow.

There are so many who assist an author in a work of this sort that it may seem ungracious to mention any. I cannot, however, omit brief acknowledgment of the debt I owe to Professor Henry R. Seager who has provided encouragement and many helpful suggestions and to Professor P. F. Brissenden who read the manuscript and pointed out certain lines of improvement. Without material aid from my parents the work could neither have been started nor carried to its conclusion. At every stage from the laborious gathering and checking of the data to the final reading of proof my wife has given the assistance and inspiration which have made possible the completion of the study.

WHITNEY COOMBS.

ALLEGHENY COLLEGE, MAY, 1926.

CONTENTS

PAGE

PREFACE 5

CHAPTER I

The Scope of the Study 11

CHAPTER II

The Sources of Information 22

CHAPTER III

Examination of the Wage Data by Industries 37

CHAPTER IV

Index Numbers of the Money Wages of Unskilled Labor, 1890–1924 77

CHAPTER V

The Real Wages of Unskilled Labor in Manufacturing, 1890–1924. 112

APPENDIX 127

BIBLIOGRAPHY 146

INDEX 159

LIST OF CHARTS

PAGE

Chart 1. Wages of Unskilled Labor in the Car Building Industry, 1890-1913 48
Chart 2. Wages of Unskilled Labor in Blast Furnaces, 1890-1924 .. 50
Chart 3. Wages of Unskilled Labor in Lumber, Planing and Millwork, 1890-1923 52
Chart 4. Wages of Unskilled Labor in the Textile Industry, 1890-1918 56
Chart 5. Wages of Unskilled Labor in the Building Industry, 1890-1924 61
Chart 6. Earnings per Hour of Unskilled Labor in Blast Furnaces, 1907 and 1913 77
Chart 7. Earnings per Hour of Unskilled Labor in the Wool and Worsted Industry, 1907 and 1913 78
Chart 8. Earnings per Hour of Unskilled Labor in the Lumber Industry, 1907 and 1913 79
Chart 9. Earnings per Hour of Unskilled Labor in the Car Building Industry, 1907 and 1913 80
Chart 10. Earnings per Hour of Unskilled Labor in Ten Industries, 1907 and 1913 84
Chart 11. Relative Fluctuations in the Money Wages of Unskilled Labor in Manufacturing, 1890-1907 97
Chart 12. Relative Fluctuations in the Money Wages of Unskilled Labor in Manufacturing, 1907-1924 98
Chart 13. Relative Fluctuations in the Money Wages of Unskilled Labor in Manufacturing, 1890-1924 (Semi-logarithmic scale) 100
Chart 14. Comparison of the Fluctuations in the Money Wages of Unskilled Labor in Manufacturing, Agriculture and the United States Steel Corporation, 1890-1924 110
Chart 15. Comparison of the Fluctuations in the Money Wages of Unskilled Labor in Manufacturing, Transportation and Road Construction, 1890-1924 111
Chart 16. Cost of Living Index (Hansen's) Compared with an Index of Retail Food Prices, 1890-1924 118
Chart 17. Relative Fluctuations in the Real Wages of Unskilled Labor, 1890-1924 121

LIST OF TABLES IN THE TEXT

PAGE

Table 1. Comparison of the Number of Unskilled Male Laborers with the Total Number of Men Employed, 1920 19
Table 2. Average Full-time Weekly Earnings of Laborers in the Lumber Industry, 1910-1915 53
Table 3. Earnings per Hour, 1907 and 1913, Selected Industries .. 83
Table 4. Comparison of Average Wage Rates per Hour and their Standard Deviations for 1907 and 1913 81
Table 5. Wages of Unskilled Labor in the Manufacturing Industries of the United States, 1890-1924 99
Table 6. Monthly Wages of Farm Labor (without Board), 1890-1924 103
Table 7. Relative Wages of Unskilled Railroad Workers, 1892-1921 106
Table 8. Relative Wages of Laborers Employed by the United States Steel Corporation, 1900-1924 107
Table 9. Wages of Common Laborers on Roads, 1915-1924 109
Table 10. Changes in the Cost of Living and the Retail Cost of Food, 1913-1924 114
Table 11. Indexes of Retail Prices, 1890-1924 116
Table 12. Real Wages of Unskilled Labor in the Manufacturing Industries of the United States, 1890-1924 119

LIST OF TABLES IN THE APPENDIX

Table A. Annual Average Unskilled Weekly Wages, by Industries, 1890-1903 127
Table B. Annual Average Unskilled Weekly Wages, by Industries, 1903-1907 134
Table C. Annual Average Unskilled Weekly Wages, by Industries, 1907-1919 137
Table D. Annual Average Unskilled Weekly Wages, by Industries, 1914, 1920-1924 141
Table E. Derivation of the Weights Used in the Computation of the Weighted Unskilled Wages Series, 1890-1924 142

CHAPTER I

The Scope of the Study

The need of the application of quantitative methods to the study of economic phenomena has become a commonplace observation. In certain fields the results from the use of such methods have been extensive and admirable.[1] The period of the World War saw the practical application of quantitative methods vastly extended in their use by the business community. General forecasting agencies, of both commercial and non-commercial types, have largely increased their services. The federal government has instituted in the Department of Commerce a clearing house for business statistics to be gathered from many and various sources.[2] The statistical studies of the Federal Reserve Board are deemed essential to the efficient functioning of the banking system. In view of this general tendency in academic, business and governmental circles toward a more accurate quantitative

[1] As examples might be cited the voluminous literature relating to the business cycle beginning with the outstanding early quantitative studies in the field, *Business Cycles*, Wesley C. Mitchell, 1913; and *Economic Cycles*, Henry L. Moore, 1914; and being continued by many recent works, such as *Employment, Hours and Earnings in Prosperity and Depression*, W. I. King, 1925; *Business Cycles and Unemployment*, President's Conference on Unemployment, 1923; *Cycles of Prosperity and Depression*, A. H. Hansen, 1921; *Generating Economic Cycles*, H. L. Moore, 1923; *Pre-war Business Cycle, 1907-1914*, W. C. Schluter, 1923; *Business Fluctuations and the American Labor Movement, 1915-1922*, V. W. Lanfear, 1924; *Social Consequences of Business Cycles*, W. B. Hexter, 1925.

[2] *The Survey of Current Business*, published by the department, contains a summary of data gathered.

measurement of various forces in economic life, the present attempt to trace with some clearness the trend of wages of unskilled or common labor needs no justification.

It may be urged that while the study is concerned with facts that are of importance, there is nothing new which further investigation needs to make clear. The general facts of wage movements may be supposed to be clearly defined in the mind of the public and to need no further clarification. The value of a study of the particular group toward which attention is here to be directed may be doubted even if a general understanding of wage movements is admitted to be desirable.

General wage movements have not been clearly understood in the past and do not seem to be in the present. It is true that federal and state departments and bureaus of labor have compiled and published a vast amount of material, some of which will later be considered in detail. A few economists have used these data to picture either economic conditions of workers at a particular period [1] or to trace the alteration of general wages over a period of years.[2] The conclusions of these studies have in general been accepted as correct by students in the field, but the general public, at least that portion which is represented by the average business man, has not been influenced in its thought by them. Observation over a narrow field may not seem to substantiate them and so they are dismissed as "theoretical" and the "practical" observed conclusions over a narrow, unrepresentative field seem to cling in the public mind. So any investigation which does not cover exactly the field of earlier

[1] Nearing, Scott, *Wages in the United States, 1908-1910.*

[2] Douglas, Paul H. and Lamberson, Frances, "The Movement of Real Wages, 1890-1918," *American Economic Review,* 11:409; Rubinow, I. M., "The Recent Trend of Real Wages" (1914), *American Economic Review,* 4:793.

ones, but which promises to throw more light on the subject, would have beneficial results.

There are ample reasons for undertaking a study of the wages of the unskilled groups. Their numerical importance in industrial society would be sufficient justification. Add to this the facts that they form the class which is least able to bear unemployment or a reduction in wages because their full-time wage is at, or close to, the margin of subsistence, that the unskilled comprise the groups on which unemployment falls most heavily as the employer feels that he will have little difficulty in recruiting his force of unskilled when industry revives, and that they are least likely to be organized and so to have opportunity for collective bargaining; and the necessity for a more accurate understanding of their wage condition becomes increasingly apparent.

A definite description of the class designated as unskilled must now be attempted. The designation appears to be one of those common terms the meaning of which is assumed by every one and which is variously interpreted at different times and by different people. An occupation considered skilled today may be considered unskilled in a decade. The educational situation in a particular country or at a particular time may determine the classification into which an occupation falls. If education is universal, an occupation that requires knowledge of reading and writing may be unskilled. In a community where education is exceptional, such a requirement makes the occupation a skilled one. Similarly in districts where manufacturing has been carried on for a long period, habits of carefulness, promptitude and responsibility in handling machinery and materials become common, and many types of machine-tending become mechanical and unskilled.[1]

Unskilled labor implies necessarily a lack of all technical

[1] Marshall, Alfred, *Principles of Economics* (5th edition), p. 206.

training before entering on the work. It is difficult to say how much training may be given by the employer "on the job" without putting the labor into the semi-skilled class. Certainly a laborer who becomes proficient at tending a machine within one to three weeks after taking up the work is not in the semi-skilled group. A useful criterion here is to determine whether the transfer of certain labor from one occupation and industry to another will cause loss to either of the industries concerned.[1] If little loss is incurred the occupation will fall into the unskilled group. In applying this criterion it will obviously be necessary to exclude certain groups of skilled engineers and others who may be employed with equal efficiency in a number of industries. If such workers are, however, changed to occupations greatly different from their customary ones, some loss will result.

Some definitions of unskilled labor may give further indication of its characteristics. The National Industrial Conference Board defines it as "the general group that performs the cruder tasks, for which no previous training is required." The semi-skilled and skilled group, as defined by this organization, is composed of the remainder, ranging from those who rank just above common laborers to the most highly skilled wage-earners. "The dividing line between these two groups is difficult to determine, but the classification follows the general understanding as to the distinction implied in these terms."[2] This last is characteristic of the vagueness of much said and written on the subject. The second definition is quoted from Mr. Lewis' recent admirable study of the opportunity given to children of the unskilled. "The unskilled workers comprise persons of both sexes who are engaged in employment that demands

[1] Palgrave, R. H. Inglis, editor, *Dictionary of Political Economy*, pp. 526-527.

[2] National Industrial Conference Board, *Research Report 69*, p. 4.

no special training, while the skilled workers are those who have undergone some particular training for a certain period in order to become fit in all branches of a special trade." [1] Perhaps the certain period needs more definiteness, otherwise the general description seems adequate. Finally it seems worthwhile to quote the distinction made by Mr. Bowley. "During the evolution of machine manufacture the modern subdivision of labour into its numerous classes has proceeded so rapidly, that it is no longer always possible to label a particular man as skilled or unskilled. There is to a certain extent, however, the distinction between the man who has learned a trade — called in Trade Union language a 'journeyman' or 'tradesman'—and the man who does only unspecialized work, and it is still the case that in any large workshop there will be found two groups of men corresponding to these two classes; for instance, a blacksmith has his striker, a bricklayer his labourer, a rivetter his holder-up, a plumber his mate, and an erector his labourer." [2]

To make a definition and to apply it are apt to be matters varying in difficulty. Such a situation is especially true so far as a classification of occupations is concerned. If a single authority could divide all wage-earners into the two groups his classification must at times seem arbitrary. His task would be immensely easier than that of one who has to attempt to use other men's classifications and to reach some sort of consistency in their use. Possibly Mr. Bowley's suggestion that the lowest figure at which a large number of men are paid be taken as the modal wage for unskilled labor would be as satisfactory as any,[3]

[1] Lewis, E. Llewelyn, *The Children of the Unskilled*, 1924, p. xv.

[2] Bowley, Arthur L., *Wages in the United Kingdom in the Nineteenth Century*, 1900, p. 23.

[3] Bowley, *op. cit.*, p. 22.

and in certain instances this method will be followed. In general, "unskilled" will be taken to mean the least skilled groups for which industry has need, a certain general level of education, intelligence, and coordination of hand and brain being taken for granted. As a means of putting this definition into practicable use for the purposes of this investigation an examination of the wage groups for which fairly adequate figures are available will be made. If the class "laborers" is included that group will be used. In many industries the use of this class alone as indicative of the wages paid to the unskilled would be misleading. It is apt to cover simply the general manual labor that may be shifted from one part of a particular plant to another. Other equally unskilled work that may be confined to a particular task will be found to be recorded as engaged in occupations which are given various designations. Through information given either in the report containing the wages in question or secured from various other matter descriptive of the particular industry, an attempt will be made to include these occupations.

In some industries for which rather detailed wage statistics exist no "laborer" group is reported. In such cases an attempt will be made to use occupations which on the basis of the actual work done seem to belong properly in the unskilled group. Occasionally recourse will be taken to the device of frankly using the lowest paid group of importance for which data are recorded in the industry as the example of its unskilled labor. Justification for this must in general be found in expediency rather than in principle. Considering the individual cases on their merits it is believed that no important error will be introduced by the inclusion of such figures. In each case when presenting the detailed figures for an individual industry the groups to which these figures relate will be ex-

amined and justification for their designation as unskilled be found. On the whole only those occupations where good health and strength are the sole qualifications are intended to be included. Apprentices have usually been omitted, for, while their actual remuneration is as little or less than that of the unskilled, the training which they receive should be considered as an increment to their wage. Apprentices are few in American industry, so they do not raise an important problem. The "helper" is sometimes learning the trade of his helpee and is sometimes simply an unskilled laborer doing the manual work for a skilled operative. The inclusion of the group with this designation has depended largely upon the conditions of the individual industry, both operating conditions within the industry and the amount of data available concerning the wages of employees being considered.

A further point on which some information is needed before entering upon the definite investigation of wage rates concerns the proportion that unskilled labor bears to the total number of men employed. Rather wide differences in estimates are found. Mr. Walling writing in 1904 concluded that approximately two-thirds of the male labor of the United States fell into the unskilled class.[1] His estimate was based partly on the 1900 census figures and partly on wage rates paid in eleven industries. Mr. Nearing, basing his estimate largely on the wages paid, found about 50% of the industrial wage-earners of the United States in the unskilled class.[2] Mr. Marshall writing particularly of English conditions estimated that the unskilled comprised one-quarter of the population.[3]

[1] Walling, English W., *The New Unionism*, 1904, pp. 298-300.

[2] Nearing, *op. cit.*, p. 191.

[3] Marshall, Afred, *Principles of Economics* (5th edition), p. 716.

These figures may be compared with the more definite and extensive analysis made by Alba M. Edwards of social-economic groups of the United States as reported by the thirteenth census.[1] In agriculture, forestry and animal husbandry, of 10,851,702 males engaged in the industry, 4,976,841 or 45.9% were found to belong in the laborer class. 488,945 of the 963,730, or 50.8%, of those engaged in the extraction of minerals were in that group. Of 8,837,901 males in the manufacturing and mechanical industries 2,532,314 or 28.7% were classified as laborers. In transportation this group comprised 1,351,636 or 53.4% of the 2,531,075 employed. For all male employed groups the number of laborers was found to be 9,594,860 or 31.9% of the total of 30,091,564.

An attempt has been made on the basis of the 1920 census figures to reach a rough estimate of the present condition in the United States. The method used requires little in the way of explanation. The figures appearing in Table 1 have been chosen from the groups that appear to be mainly unskilled. Exact statistical accuracy is not attempted. The methods of classification employed by the census make a pretense of exact measurement absurd. For example, miners are grouped by the census report in a single class. The general conclusion from the figures quoted is that about one-third of those included in the agricultural, the manufacturing, and the transportation groups are unskilled. If attention be directed to the manufacturing and mechanical industries grouping, about 25% are found to be unskilled and almost the same proportion in the unskilled-semi-skilled class. In the transportation grouping over 55%, and in the agricultural grouping over 35% are unskilled.

While emphasis must be again placed on the fact that

[1] *Publications of the American Statistical Association*, vol. xv, pp. 643-661.

these figures are only approximations,[1] they are sufficient to indicate that the unskilled laborer's wage is far from being a wage that affects few individuals. A study which shows the tendencies that such a wage has had during the last thirty-five years will necessarily include much of the economic and social problems that have affected American labor in general.

There have been indicated in a general way some of the reasons for making an investigation of the wages of unskilled labor and the type of labor included in that classification, together with an estimate of its importance in the total of those employed. This introductory material will be concluded by a brief description of the method to be used in carrying through the study.

TABLE I

COMPARISON OF THE NUMBER OF UNSKILLED MALE LABORERS WITH THE TOTAL NUMBER OF MEN EMPLOYED, 1920[2]

Total number employed in agriculture, forestry and animal husbandry	9,869,030
Unskilled Agricultural Groups:	
Dairy farm, farm, and stock farm laborers	3,248,712
Garden, greenhouse, orchard, and nursery laborers	127,589
Other lumbermen, raftsmen, and woodchoppers	179,496
Total for above groups	3,555,797
Per cent of unskilled in agriculture, forestry and animal husbandry	36%
Total number employed in manufacturing and mechanical industries	10,888,183

[1] For example, they include all males over ten years of age, thereby increasing the proportion of the unskilled group.

[2] Figures and occupational designations from the *Fourteenth Census of the United States*, 1920, vol. iv, *Population, Occupations.*

Unskilled manufacturing and mechanical groups:	
Laborers:	
Building, general, and not specified	608,075
Chemical and allied industries	70,994
Cigar and tobacco factories	21,295
Clay, glass, and stone industries	120,215
Clothing industries	6,414
Food industries	143,397
Harness and saddle industries	1,727
Helpers in building and hand trades	63,412
Iron and steel industries	717,022
Other metal industries	62,771
Lumber and furniture industries	309,874
Paper and pulp mills	49,786
Printing and publishing	8,886
Shoe factories	14,194
Tanneries	26,703
Textile industries	120,341
Other industries	426,398
Total for above groups	2,771,504
Per cent of unskilled in manufacturing and mechanical industries	25%
Total number employed in transportation	2,850,528
Unskilled transportation groups:	
Longshoremen and stevedores	85,605
Sailors and deck hands	54,800
Draymen, teamsters, and expressmen	410,484
Laborers (garage, road, and street)	158,204
Laborers (railroads)	488,659
Laborers (other transportation pursuits)	33,229
Total for above groups	1,630,981
Per cent of unskilled in transportation	57%

Chapter II will be concerned with the sources of information concerning wages in the United States and with previous historical studies of the wage situation. Particular

attention will be paid to official records of wages, and to those series which depict the condition of certain groups of workers over a period of years. In Chapter III the material to be directly used in the present study will be described by industries. For those industrial groups for which extensive data are available definite series of figures will be set forth for purposes of comparison. Chapter IV will attempt to evaluate the data that are available and will combine them into an index of unskilled labor for the manufacturing industries of the United States. The value of certain forms of average and of methods of combining figures to form index numbers of wages will be considered. A method which will approach a fair standard of accuracy and which will still be usable with the data that are available will be evolved. The index that is computed on this basis will be compared with others that have been computed by less accurate methods. Indexes of the variations in unskilled wages in agriculture and transportation will be presented, and they will be compared with the manufacturing index. Chapter V will deal with the important problem of the effect of the changing value of money on unskilled wages. A detailed examination of the changes in the power of the wage of the unskilled worker to purchase goods will be the concluding, as well as the most important, part of the study.

CHAPTER II

The Sources of Information

One principle needs to be laid down before we begin the consideration of available data. The present study is an attempt to find the general trend of the wages of unskilled labor during the last thirty-five years. For that reason the chief emphasis will be placed upon those data that have appeared from year to year. This will explain the apparent disregard in this chapter of certain intensive investigations that have been made of conditions during a single year. Some of these will be used to attempt to corroborate the more continuous data, but otherwise they will not be considered.

Primary attention is paid only to conditions since 1890, but it will both make clearer some of the difficulties of carrying on such an investigation and make more intelligible the material used, if the investigation of sources is carried back to an earlier date. The first official figures on wages in the United States appeared in the census of 1850, where an estimate of labor costs was computed in connection with the census of manufactures.[1] In some of the later census reports such a figure, divided by the total number of workmen, is listed as "average wages".[2] By 1890, however, it was realized that an estimate computed in this way presented little or nothing of value and a note appeared stating that

[1] *Abstract of the Statistics of Manufactures according to the Returns of the 7th Census*, 35th Cong., 2nd Sess., Ex. Doc. No. 39, pp. 137-143.

[2] *8th Census of the United States, Manufactures*, pp. x, xi, xxii, lxxxvi *et seq.*

no comparison from one census period to another of this average wage figure should be attempted.[1] Finally in the 13th census (1909) the computation of this so-called average wage was given up.[2] Its inadequacy as an indication of wage trends in any particular group is obvious and from the present point of view no further attention need be given it.

In 1860 the Census contained a table entitled "Pauperism, crime and wages" which gave by states and territories average wages paid to farm hands, laborers, carpenters, and female domestics.[3] This is of interest as the first published attempt of the Census Bureau to indicate the level of wages paid to the unskilled. The cost of board to laboring men was also given. No details concerning the method of computing these figures were contained in the report.

The 1890 census report contained tables classified as to wage rates by industries covering all officers, firm members, clerks and wage-earners employed in fifty industries in one hundred and sixty-five principal cities.[4] The inclusion of the salaried employees with the wage-earners diminished the value of these data, but they might have formed the beginning of an extensive study of wages in the country to be compiled every ten years and supplemented annually or oftener by studies on a smaller scale. The facts that the study was not repeated and that it gave no attention to the wages of occupations within the industries make it of no significance for present purposes. The data mentioned cover

[1] *11th Census of the United States, Report on Manufacturing Industries*, 1895, pt. i, p. 14.

[2] "Such a broad average would have little significance being based on widely varying rates of compensation," *13th Census of the United States*, vol. viii, p. 281.

[3] *8th Census of the United States, Statistics*, 1866, p. 512.

[4] *11th Census of the United States, Manufacturing Industries*, 1895, pt. i, table viii, p. 653 *et seq.*

all that has appeared on wages in the regular census reports. Special reports of the Bureau which have supplied information on the subject are of much more importance. In connection with the 10th Census special reports appeared on average wages paid skilled and unskilled labor in the iron and steel industry.[1] Similar information appeared concerning a number of occupations in the silk industry.[2] In a detailed report on the manufacture of glass, Joseph D. Weeks gave average wages accompanied by the range.[3] Similar data appeared on the coke industry.[4] Finally there was published as a special volume (XX) of the same census a report on wages in manufacturing industries covering some 51 different industries and 627 establishments.[5] One of the returns contained data going back as far as 1801. Many went back thirty or forty years. Wages were expressed by occupation within the individual factories concerned and wage tables of certain classes of occupations were combined. No summary of the whole report was made and no idea given of the method by which averages were computed. Wages were expressed in an amount per day with no indication of how many were affected and little of the hours a day that they worked. The report is noteworthy so far as the present study is concerned in that it attempted to carry a series of wages back over a period of years and to present data which might afford a basis for a study of the trend of wages.

[1] *10th Census of the United States, Report on the Manufacturers of the United States*, 1883, pp. 745-768.

[2] *Ibid.*, p. 931.

[3] *Ibid.*, pp. 1044-1045.

[4] *10th Census of the United States, Report on the Manufacture of Coke*, Joseph D. Weeks, 1884, pp. 8-9.

[5] *10th Census of the United States, Report on the Statistics of Wages in the Manufacturing Industries*, Joseph D. Weeks, 1886.

In 1903 the Census Bureau made its greatest contribution to wage statistics in the form of a volume entitled *Employees and Wages.*[1] This was a collection of wage rates covering thirty-four industries divided among three hundred and eighteen occupations for males and eighty-two for females. Seven hundred and twenty payrolls were used in its computation. It gives wage data for only two years, 1890 and 1900. It was carried on under the best principles of any wage investigation up to that date. It was restricted to a few stable and normal industries. Actual wage rates were collected. Employees were classified by rates of wages and by occupations. The resulting groups of weekly wages were tabulated in fifty-cent interval groups, a cumulative percentage column as well as actual numbers of those in each group being included in every table. For comparisons between the two years for which the data were collected the median and quartiles were used. An examination of almost any of the tables shows both the difficulties and advantages of such a means of comparison. The median may increase while one quartile increases and the other decreases, or both decrease. It is difficult to indicate what has happened to wages as a whole under such conditions. A description cannot be concise or definite. On the other hand there is not the excessive—and sometimes false—appearance of accuracy that a mean would give. If the range of wages considered is not great, the definiteness of the mean probably makes it the most satisfactory average. Where the range is great the method used by Dewey has much to commend itself.[2]

[1] *12th Census of the United States, Special Reports, Employees and Wages*, Davis R. Dewey, 1903.

[2] Criticisms and summaries of the Dewey report that should be mentioned are: Abbott, Edith, "Wage Statistics in the Twelfth Census," *Journal of Political Economy*, vol. xii, pp. 339-361; James, A. E., "The Dewey Report," *Publications of the American Statistical Association*, vol. x, p. 319 *et seq.*; Moore, H. L., "The Variability of Wages," *Political Science Quarterly*, vol. xxii, pp. 61-73.

The most useful collection of wage statistics of the last century was contained in the Aldrich Report,[1] two and a half volumes of which were devoted to the subject. The report was compiled under the direction of a Republican Senate to show the advantageous effect of the tariff on wages and prices. The raw material on which the wage report was based was supplied by the Department of Labor and may be considered wholly unprejudiced. The detail into which the schedules of wages go makes the report of tremendous value to the student of wage changes from 1860 to 1891. There are 543 series of wage returns covering that period.[2] Twenty-one different industries are considered, two of which were "not of sufficient consequence to be specifically noted in the census tables," and three others which employed less than 5,000 in 1880.[3] Eighty-eight individual establishments furnished data concerning 8,290 employees in 1891. The census of 1890 [4] showed 3,745,123 males above sixteen years to be employed in the manufacturing industries, so the sampling was rather slight. The territory covered was, with the exception of one establishment,[5] restricted to the portion of the country north of the Potomac and east of the Ohio. The fact that an attempt was made to present an annual report on wages for almost half a century and that the original data are reproduced makes the report, in spite of its lack of extensiveness, of great value. To the interpretation of the report by the committee no attention need be paid here. In later discus-

[1] *Wholesale prices, wages and transportation, Senate Report no. 1344*, 52nd Cong., 2nd Sess., vol. i; Summary, vols. ii-iv, Tables of data.

[2] *Ibid.*, vol. i, p. 110.

[3] *Ibid.*, vol. i, p. 175.

[4] *11th Census of the United States, Manufacturers*, pt. i.

[5] Data concerning 362 employees in an establishment manufacturing illuminating gas in Ohio are given in vol. iii, pp. 925-932.

sion of statistical measurement of wages reference will be made to methods that are statistically incorrect. The fact that the Aldrich Report was a pioneer and was made for a definite purpose makes such criticism of importance only in so far as it indicates methods to be avoided. Miss Abbott's [1] study of the wages of the unskilled, to which extensive reference is made later,[2] used much of the data collected for the Aldrich Report. The general wage and price data have formed the basis for numerous other studies of the variation of prices and wages during the last half of the nineteenth century.[3]

The next comprehensive collection of American wage data appeared somewhat more than ten years after the Aldrich Report in the Nineteenth Annual Report of the Commissioner of Labor (issued in 1905). The material presented covered 67 industries, 519 distinct occupations and 3,475 establishments.[4] Territorially the data seemed to be fairly representative.[5] The period covered is from 1890 to 1903. Due to lack of space only the number of employees, the average hours per week and the average wage per hour are included for all the industries concerned, although for certain selected occupations classified tables are presented. From the point of view of scope this report is a vast improvement over the Aldrich Report. It is unfortunate that

[1] *Journal of Political Economy*, vol. xiii, pp. 321-367.

[2] *Infra*, p. 34.

[3] *Cf.* especially Mitchell, Wesley C., *History of the Greenbacks* and *Gold, Prices and Wages under the Greenback Standard*, and Bowley, A. L., "Comparison of the Rates of Increase of Wages in the United States and in Great Britain," *Economic Journal*, vol. v, pp. 369-383.

[4] *19th Annual Report*, p. 11.

[5] Data were collected from forty-one states. The country is divided into five geographic divisions and figures are presented by industry and occupation for each of these divisions. For many industries figures are given for each division.

it could not be presented with completely classified tables for all occupations. Yearly revisions by the Bureau of Labor Statistics carried this report on through 1907,[1] extending the number of samples secured within the various industries although eliminating some of the minor industries that were examined in the first report. Here for the first time, so far as the federal government is concerned, an attempt was made to present an annual description of wage conditions in American industry. The early part of the index of unskilled industrial labor to be made by the present study will be based primarily on the data presented in these reports.

From 1907 to 1913 the Bureau of Labor Statistics issued no reports dealing with general wages in industry. Some reports were prepared under the direction of the Commissioner of Labor covering wage conditions at specific periods in the telegraph industry (1907 and 1908),[2] in the Minnesota iron mines,[3] in the Bethlehem Steel Works (1910),[4] in the iron and steel industry in general,[5] of women and child wage-earners (1907 and 1908),[6] and of textile workers in Lawrence, Massachusetts (1911).[7] These gave definite details of conditions at a definite time, but permitted little comparison with earlier periods.

In 1913 the Bureau began a series of reports on wages in individual industries and there were issued in rapid suc-

[1] *Bulletins 59, 65, 71 and 77.* (Publications designated *Bulletins* are publications of the Bureau of Labor Statistics of the United States Department of Labor.)

[2] *Senate Document 725,* 60th Cong., 2nd Sess., pp. 42-50, 183-510. (Little information concerning unskilled.)

[3] *Bulletin 84.*

[4] *Senate Document 521,* 61st Cong., 2nd Sess., pp. 57-108.

[5] *Senate Document 110,* 62nd Cong., 1st Sess., vols. i and ii.

[6] *Senate Document 645,* 61st Cong., 2nd Sess., esp. vols. i-v, xi, xii, xviii.

[7] *Senate Document 870,* 62nd Cong., 2nd Sess., pp. 71-142, 217-477.

cession data covering cotton,[1] woolen,[2] silk,[3] lumber,[4] millwork,[5] furniture,[6] boots and shoes,[7] hosiery and knit goods,[8] cigars,[9] clothing,[10] railroad cars,[11] and iron and steel.[12] These reports included data from 1907 up to the date of issue. They contained classified tables of wages and hours, and were, in general, great improvements over what had preceded them. The number of establishments covered is in general ample. Many of the reports, however, exclude all occupations except those containing the largest number and hence there is often difficulty in carrying through an investigation of wages in a particular occupation. These industrial wage surveys have been continued in most cases although since 1913 they have usually been biennial rather than annual. No recent report has been published on the silk industry, the cigar industry or on the making of railroad cars. Foundries and machine shops,[13] the automobile[14] and automobile tire,[15] the slaughtering and meat packing,[16] and the paper and pulp[17] industries have recently been added

[1] *Bulletins 128, 150, 190, 239, 262, 288, 371.*

[2] *Bulletins 128, 150, 190, 238, 261, 289, 327, 377.*

[3] *Bulletins 128, 150, 190.*

[4] *Bulletins 129, 153, 225, 317, 363.*

[5] *Bulletins 129, 153, 225.*

[6] *Bulletins 129, 153, 225.*

[7] *Bulletins 134, 154, 178, 232, 260, 278, 324, 374.*

[8] *Bulletins 134, 154, 177, 328, 376.*

[9] *Bulletins 135, 161.*

[10] *Bulletins 135, 161, 187.*

[11] *Bulletins 137, 163.*

[12] *Bulletins 151, 168, 218, 305, 353, 381.*

[13] *Bulletin 362* (1923).

[14] *Bulletin 348* (1923).

[15] *Bulletin 358* (1923).

[16] *Bulletin 373* (1923).

[17] *Bulletin 365* (1923).

to the list. The contents of the bulletins issued as a result of these investigations need no present examination. From the point of view of the student of wage conditions they have become increasingly useful. Starting with a discussion of full-time earnings per week only, they now add to that the actual earnings over a certain pay period in the year being studied. The deficiencies that still exist will be discussed when figures from these bulletins are used.

The Bureau also began in 1913 the publication of bulletins entitled "Union scale of wages and hours of labor." [1] Data were collected from cities in various parts of the country from labor unions and are representative of the changes in rates paid to the classes of labor that are organized. The unskilled group with which we are here concerned is little represented in the collection and so, except for the purpose of comparisons, these bulletins need be given little attention.

The War Industries Board requested the Bureau of Labor Statistics to make a survey of wages in industry in the United States. Its purpose was to be the making "available a body of reliable information about wages and hours of labor in the different industries that would be of assistance in making an equitable solution of labor problems arising in the industries and at the same time furnish a record of industrial conditions at the height of war production." [2] The latter purpose was not attained because of the ending of the war before the work could be gotten under way. It was thought that the study would be of value during the reconstruction period and it was carried through with much detail in the first half of 1919. The period itself was one of transition from war to peace conditions and so the result of the Bureau's work is somewhat mixed in value. As far

[1] *Bulletin 143*, continued in *Bulletins 171, 194, 214, 245, 259, 274, 286, 302, 325, 354.*

[2] *Bulletin 265*, p. 5.

as method of collecting data and manner of presentation are concerned the investigation is worthy of much attention. There is much data concerning unskilled labor, indeed it is possible to portray the condition of such labor in the first half of 1919 with more accuracy than at any other time. A few details of the investigation will make clear its importance. The sampling method seems to have been judiciously applied. Of the 28 industries covered, 2,365 establishments in 43 states furnished data. The wage rates of 404,758 employees were collected. Published data included the average hours worked per week-day and the average wage per hour worked. No figure of daily or weekly wage rates was printed, but their computation requires only simple multiplication.[1] The presentation of an actual weekly figure of earnings would have made comparisons more easy. It should be noted that the data of this report differ from the earlier ones in that actual earnings instead of full-time theoretical earnings are recorded, and hence the 1919 figures are not strictly comparable with others used.

The actual presentation of data is excellently done. Classified tables of hours and hourly rates give much information as to the distribution of earnings. Figures are given for occupations as a whole and subdivided into those for states and in some cases cities. The limitations on conclusions to be drawn from the report are set forth frankly. While the expense of such a survey precludes its annual use, its value if repeated at even five-year intervals would be great, especially if a small-scale sample of conditions could be secured for each of the intervening years.

The studies that have been described are the primary official sources of information to be used in tracing the wages of

[1] The average hours per week day is figured on the basis of a six day week. Thus an employee working twelve hours per day, seven days a week is recorded as working a fourteen hour average. *Bulletin 256*, p. 13.

unskilled labor in the manufacturing industries. There are many corroborative sources both of the federal government and of the states. Congressional investigations have from time to time brought forth much of value on the subject. The reports of the Immigration Commission (1908-1909),[1] the telephone investigation in 1909-1910,[2] the report on the strike at South Bethlehem[3] and on the conditions in the iron and steel industry in general in 1910[4] all have data of direct interest and that are useful in checking the results of the continuous series. The state figures of value come mainly from Massachusetts and New York, and might be used for regional comparisons.

Figures concerning laborers in agriculture have been collected and compiled by the Department of Agriculture.[5] This group of laborers will be represented by indexes compiled from those figures. The Interstate Commerce Commission publishes the earnings of railroad employees,[6] and while statistically the published figures have been open to many criticisms, they give an indication of the trend of compensation of the railroad group of unskilled.

The chief continuous unofficial collection of wage data has been compiled by the National Industrial Conference Board.[7] This is a study of the wages of skilled and un-

[1] *Senate Document 633*, 61st Cong., 2nd Sess., vols. vi-xx.

[2] *Senate Document 380*, 61st Cong., 2nd Sess., pp. 180-301.

[3] *Senate Document 521*, 61st Cong., 2nd Sess., pp. 57-108.

[4] *Senate Document 110*, 62nd Cong., 1st Sess., vols. i and ii.

[5] Published annually in *The Year Book of the Department of Agriculture* (pp. 1148-1149 in 1923 yearbook).

[6] Reported annually in the *Annual Report of the Commission* and monthly in special announcements. *38th Annual Report of the Interstate Commerce Commission*, pp. 114-116.

[7] *Wages and Hours in American Industry, 1925.* (Earlier reports bear slightly different titles.)

skilled employees in twenty-three manufacturing industries. Data are given for July, 1914, and then recommenced in July, 1920, and carried by months up to the present (with the exception of the first half of 1922). 1746 plants have supplied information concerning the wages (in January, 1924) of 743,227 employees, which is approximately 20% of the wage-earners in the industries covered. The reports record average hourly and weekly earnings and average hours per week. Industries are analyzed separately and a general composite figure for all the industries computed. The base of July, 1914, is used for the relative figures, and because of the situation at that time, decreases their value. In spite of the fact that the board is a parisan, i. e., a manufacturers' organization, its work has been carefully done and its figures are worthy of close attention. They will be compared with the figures secured from official sources and, where available, used to remedy the gaps in the official figures. During the war period the Bureau of Applied Economics, a research organization, some of the members of which have been identified with investigations fostered by labor interests, made a number of investigations into the wage situation.[1] Little original material appeared in its work and it will be referred to only for occasional verification in the work that follows.

Many scattering sources have contributed bits of valuable information. Trade publications have been especially rich in information concerning the wages of the unskilled in road work,[2] excavating,[3] and the like. While such information is rarely of a type that can be used in rigid statistical investigation, it often supplies testimony that serves to confirm or cast doubt on data which have been compiled in a manner that makes them susceptible of scientific treatment.

[1] *Bulletins 1, 4* and *8* of the Bureau of Applied Economics.

[2] *Engineering and Contracting*, 48: 172, August 29, 1917.

[3] *Engineering News-Record*, 92: 748-9, April 24, 1924.

The official data that have been mentioned have been the basis of a number of investigations conducted on lines somewhat similar to the present one. The one deserving most attention here is Miss Edith Abbott's study of the wages of the unskilled from 1850 to 1900.[1] The data used are derived mainly from the Aldrich Report supplemented by material from the 10th Census, Bulletins number 18 and 53 of the Department of Labor and from the publications of the Department of Agriculture. While it is admitted that the scantiness of the data makes the conclusions subject to much qualification, the fact that the available data are carefully compiled and subjected to all possible checks makes the results worthy of attention. The wage series used in compiling the index cover 1,888 unskilled workers, classified in the following manner.[2]

CONSPECTUS OF THE ALDRICH REPORT DATA

I. *Occupations*

Occupations	No. of States	No. of Wage-series	No. of Industries
Laborers	9	26	13
Teamsters	4	9	7
Yard hands	2	6	5
Watchmen	7	14	7
Coal-wheelers	2	3	2
Quarrymen	2	3	2
Unskilled factory operatives	5	34	4
Helpers	6	38	4

[1] Abbott, Edith, "The Wages of Unskilled Labor in the United States," *Journal of Political Economy*, vol. xiii, pp. 321-367.

[2] *Ibid.*, p. 353.

II. *Industries*

Industries	No. of States	No. of Wage-series	No. of Establishments
Agricultural implements	1	1	1
Ale, beer and porter	1	2	1
Books and newspaper	1	1	1
Building trades	5	10	8
City public works	2	3	2
Cotton goods	2	19	5
Ginghams	1	5	1
Illuminating gas	3	8	3
Leather	2	8	3
Lumber	1	2	1
Metals and metallic goods	6	44	17
Paper	1	2	1
Spice	1	2	1
Stone	3	6	4
White lead	1	2	1
Woolens	2	17	3
Carriages and wagons	1	1	1
Total	10	133	54

The index that is computed from the data is based on a simple average of the quotations used, each being given equal weight. From 1860 to 1890 only the figures of those establishments furnishing data continuously through the period are used. The following table contains the summary index numbers that were computed.

TABLE OF RELATIVE WAGES, 1860–1891 [1]
(100 average for 1851-1860)

Year	Relative Wage	Year	Relative Wage	Year	Relative Wage
1860	104.0	1871	188.8	1882	143.4
1861	106.0	1872	189.8	1883	145.4
1862	110.1	1873	182.8	1884	144.4
1863	125.7	1874	171.7	1885	141.4
1864	141.4	1875	159.5	1886	146.4
1865	158.5	1876	149.4	1887	142.9
1866	163.6	1877	136.3	1888	146.4
1867	161.6	1878	135.3	1889	146.4
1868	166.6	1879	130.3	1890	148.3
1869	192.9	1880	132.3	1891	150.0
1870	190.9	1881	136.8		

[1] *Ibid.*, p. 366.

Other investigations making use of the data need only brief description. Most important of them, for present purposes are the investigation of wages from 1860 to 1880 made by Mr. Mitchell [1] in his *Gold, Prices and Wages,* 1860-1880, the detailed study of the variations in the years 1860 to 1865 in his *History of the Greenbacks,*[2] his brief consideration of labor costs (from 1890-1907) in *Business Cycles,*[3] and a study of wages in the cotton industry made by S. E. Howard.[4]

[1] Mitchell, Wesley C., *Gold, Prices and Wages,* p. 92 *et seq.*

[2] Mitchell, Wesley C., *History of the Greenbacks,* pp. 280-351.

[3] Mitchell, Wesley C., *Business Cycles,* pp. 130-139.

[4] Howard, S. E., *The Movement of Wages in the Cotton Manufacturing Industry of New England since 1860.*

CHAPTER III

Examination of the Wage Data by Industries

In this chapter the level of wages of the unskilled will be presented by industries. The earlier part of the data will be taken from the 19th Annual Report of the Commissioner of Labor and its supplements to 1907, and the latter part from the industrial investigations of the Bureau of Labor Statistics that began to appear in 1913. Those industries for which fairly complete and comparable data exist through the whole period from 1890 to the present will be first examined and then the industries for which data are only available during part of the period. In the former class are car building (to 1913), blast furnaces, lumber, planing (to 1913), building, and the textiles. Industries represented by incomplete data include brick-making, flour, foundry, gas, glass, liquor, marble, paper and pulp, petroleum, rope, shipbuilding, soap, construction work on streets, sugar, and tinplate. In some of these cases the material available is very slight and they might well be dropped. In other cases, in spite of unfillable gaps, the material that remains is of such value that its inclusion is necessary. The distinction to be made here will be perhaps clearer after a detailed examination is made of all that is to be found.

An explanation of the meaning of level of wages must precede the presentation of the actual data. Theoretically this would mean the actual wages received by laborers of the class examined combined into some form of average. If it be necessary to confine attention to such a figure the information will be very meagre. Lack of statistical data here,

as in many fields of social investigation, will make necessary the use of the available data, not of data that exactly suit the purpose. The data presented in the 19th Annual Report illustrate the difficulty referred to. The figures there recorded are "data from that portion of each year's payrolls most nearly representing the normal conditions in the establishment during the year."[1] Thus, if the figures are carefully collected, they represent the normal level of wages. It was apparently left to the discretion of the agent collecting the information to decide when this period of normal condition should be. It may be assumed that the figures given represent a figure equal to or higher than the average wage of labor during the period. That is, the normal period has been taken generally as one in which the establishment is working full time. The closeness of the normal figure to the actual one varies among industries, and from year to year in any particular industry. The manufacture of clothing, for example, is much more subject to seasonal variation than the telephone industry.[2] The industry in which employment is fairly regular will be reasonably accurately depicted in the wage figures given, while the industry in which seasonal unemployment is customary may have its wage figures somewhat exaggerated. Similarly figures within the same industry are not strictly comparable from one year to another. The normal figure of the reports is apt to be little influenced by cyclical changes in employment. Enumerators or reporting manufacturers are apt to regard such changes as abnormal and fail to consider them in compiling their reports of wages. So in the dull year of the cycle the figures may be expected to overestimate the condition of the wage-earner, mainly because of the fact that he is working part time, and

[1] *19th Annual Report*, p. 11.

[2] Illustrated in charts prepared by the author for the Annual Report of the Illinois Department of Labor for the year ending June 30, 1925.

in the years of prosperity his condition is frequently better than that revealed by the series of data that are used. Material is not available with which to show the relationship between full-time wages under normal conditions and actual earnings. Figures concerning the latter would naturally be more desirable, but as they are limited to a few industries and to recent years, resort to the full-time normal data must be made and their limitations kept firmly in mind.

Two expressions of wages are possible with the data available, either the use of the rate per hour or of the full-time wage per week. Choice of the latter seems the more reasonable. It is desirable to include in the figure used some indication of the number of hours per week that are worked and the weekly wage accomplishes this. Measurement of two wage rates with no consideration of the number of hours worked might lead to entirely erroneous conclusions. By using the product of the number of hours of labor per week and the rate per hour both factors are given some consideration.[1] It is, after all, the amount that the worker gets per week rather than the amount which he gets per hour that determines his material standard of living.[2] This does not mean that comparisons of rates per hour are meaningless, but simply that the weekly comparison seems more significant. For these reasons the wages considered will be turned, where possible, into amounts received per week.

[1] Where the reports give the average wage per hour and the average hours per week for an occupation, the product of these averages is apt to be a distorted figure. A comparison of such a product from year to year is however of much significance, and while the justification for the use of such a figure must be based on grounds of expediency rather than of theory, where an average full-time earnings figure is not available, the product will be used.

[2] The factor of regularity of employment must be added to the weekly wage in order to express those factors determining material standards of living. The yearly earnings or the life earnings figures, if either were computable, would be more satisfactory than weekly rates.

No theoretical discussion of the type of average that is best suited to express the trend of wage figures is here necessary. Two reasons may be given for this. The first, a practical one, is sufficient, but fortunately it may be somewhat strengthened by the second which lies in the realm of theory. The data as they are given have been reduced to an arithmetic mean and in practically all cases are not classified in such detail as to permit the computation of any other type of average. In some cases, particularly with the recent data, the mode or median of the rate per hour or hours per week can be found from the data given, but such detail does not extend to the wage per week with which this investigation is concerned. So, if use is to be made of the data, the arithmetic mean must be the average employed. The inaccuracy of any average and especially of the arithmetic mean in an expression of wage rates has been often set forth.[1] The same average may be obtained under wholly different conditions.

There are, however, at least two conditions under which the average is useful and under which the arithmetic mean is a satisfactory form of average. If an exhaustive compilation of wages in general be made from year to year it will be found that the various samples chosen are grouped about the average in rough accordance with the curve of error.[2] So long as the general grouping remains the same the average of the group is a satisfactory indication of the trend of wages of the group. A difficulty arises from the fact that nothing about the average necessarily gives any indication of a change in that grouping. If a single occupation or a single type of work be considered, this type of

[1] *Cf.* for example, Secrist, Horace, in *Pub. Amer. Stat. Asso.*, vol. xiii, p. 279.

[2] Bowley, A. L., "Comparison of the Changes in Wages in France, United States and the United Kingdom from 1840 to 1891," *Economic Journal*, vol. viii, p. 474.

difficulty is reduced to a minimum. Where the range is comparatively slight and the vast majority of the cases closely grouped about the average, it seems safe to base deductions on the fact that the arithmetic mean is a reasonably accurate indicator of the amount of change and of the absolute amount of the wages in question. Such is in general the case with the wages of unskilled labor. Occasionally exceptionally high wages will be found in this classification. Usually if the original data could be examined some exceptional condition would be discovered. To exclude such cases without examining the original data would savor of shaping the data to fit the expected conclusion and so no attempt will be made to separate them from the rest of the data. Their importance in altering the general average of the unskilled in any industry is slight.

One further brief explanation should perhaps be given. In the use of the arithmetic mean it must constantly be kept in mind that the average wage is usually a wage that no employee actually receives, but it is one which better than any other average indicates any change in wages as a whole. A modal or median wage has the advantage of being a figure that is actually received by some employee, although in the case of the median possibly (but rarely) it is being received by only one employee.[1] Important changes may take place in all wages above or below the median and not be reflected at all by an altered median. The same may be true with wages above or below the modal group. This would not be true with a wage grouping represented by the arithmetic mean.[2]

[1] The mode and median do not possess this advantage when they are computed from frequency data rather than from actual wage rates.

[2] It may be objected that it is possible to think of changes taking place above and below the arithmetic mean and neutralizing each other in such a way as to have no effect on the mean. The chance of such changes occurring is vastly less with the mean than with either mode or median.

Much could be indicated as to changes in wages from one year to another if with the average wage could be included the average or standard deviation. With the data that must be used in the present study computation of the deviation is impossible, but it is to be hoped that future studies will be able to use this valuable measure along with the mean. An example will suggest its use. The average wage (arithmetic mean) of laborers in blast furnaces in 1911 was $11.14, in 1912 the average was $11.15. From these figures it might be assumed that little change had occurred in the wages of these laborers from one year to the other. If, however, it were possible to compute the standard deviations and they were found to be $0.75 in 1911 and $1.75 in 1912, it would be possible to correct that assumption by the further information that while in 1911 the great majority (about 99%) of the actual wage rates lay between $8.89 and $13.39, in 1912 the range had increased from $5.90 to $16.40. In other words, in 1911 the wages considered lay closely about the mean and in 1912 they varied much more greatly both above and below it. These conclusions, it must be admitted, become less valid if the distribution varies greatly from the symmetric form,[1] but for any collection of wages within a single occupation they would be worthy of attention.

CAR BUILDING

The data that are available in the car-building industry are a fair example of the sort of information that must be used in attempting to map the course of wages of the unskilled laborer since 1890. From 1890 to 1903 data from the *19th Annual Report*[2] are used. From 1903 to 1907

[1] Yule, G. Udny, *Theory of Statistics*, 1919, pp. 140-141.

[2] Reference in the pages that follow to the *19th Annual Report* should be understood as meaning the *19th Annual Report of the Commissioner of Labor, 1904.*

data are supplied by *Bulletins 59, 65, 71* and *77*. Separate publications, *Bulletins 137* and *163*, appeared in 1913 and 1914 and carried the wage data for the industry through the year 1913. The next wage figures on the subject compiled by the federal bureau appeared in 1919 in *Bulletin 256*. Thus there are figures for each year from 1890 to 1913 and for 1919.

The occupation in the industry which is used is given the common designation of laborer. The other occupations for which figures have been collected are properly considered in the skilled or semi-skilled class. The sample of unskilled wages in the industry seems fairly adequate. Up to 1903 there are data for 11 establishments having from 610 to 1190 employees. In 1903 the number of establishments reporting increased to 41 with 7,304 unskilled employees. The largest number of employees was covered in 1910 with figures concerning 10,114 employees in 68 establishments. Three years later 72 establishments are represented, although the number of employees covered had dropped to 9,818. In the 1919 survey figures were collected from 22 establishments which employed 1,879 unskilled laborers. The figures in 1913 were gathered from plants employing over 20% of the total employees in the industry in the United States. The 1919 figures were from plants with somewhat less than 5% of the total employees. Hence the value of the figures as representative of the industry in the United States varies. The 1913 figures may be considered as satisfactory. They are gathered from 18 different states in which are included all the states except four having more than 5,000 employees in the industry according to the Census of 1910. All states (13 in number) having over 7,600 employees in the industry at that time are represented by figures gathered from two or more establishments. Pennsylvania, with the largest number of employees reported, is

represented by eight establishments; Ohio by nine. The 1919 figures are much less extensive. They are gathered from 14 different states, but only 22 establishments in these states furnished data. Of the 18 states furnishing figures in 1913, 11 supplied data in 1919. The six leading states are covered for each year. The real test of the value of the 1919 compilation rests on the representative character of the establishments chosen and concerning that there is only the Bureau's statement, "For each industry in each state a sufficient number of representative establishments was included to insure fairly typical results."[1] The number of establishments used, if chosen wisely, is probably sufficient to give a fairly good indication of the wages being paid in the industry at the time. A greater number would certainly be desirable, but there seems no reason for discarding the data unless some independent source shows it to be unworthy of credence.[2]

Even if the data for any particular years are fair samples there may still exist the question of comparability over a period of years. Is it proper to take the average wage of the unskilled in the car-building industry in 1890 as shown by the data presented and to compare it with the 1913 or 1919 average gathered from a different group of establishments? The basis of this whole investigation must rest on the assumption that there is value in such comparisons. If any statistics desired could be got, it would still be a better procedure to keep adding to and altering the establishments than to continue the same ones over a long period. The

[1] *Bulletin 265*, p. 7.

[2] It is recognized that the adequacy of a sample of wage data does not depend primarily upon the number of wage quotations or even upon the number of establishments represented. The distribution of the establishments that contribute data must be compared with the distribution of all establishments in the industry and on the basis of that comparison the adequacy of the sample may be determined.

changing character of industry gives ample justification for such a method. It is often of value to take the average wages of identical establishments over a two-year period and to compare them with a much larger number of establishments that have supplied figures for one of the years in question. For example, in 1903 data are presented for the 11 establishments which are carried back to 1890 and for 41 establishments for that year only. The figure for the smaller number of establishments is $8.11 per week, while for the larger number it is $8.65, a difference of over 6%. The latter figure is undoubtedly the more representative, but used in connection with the other figures indicates an increase that in fact did not come at the time in question. In presenting two groups of figures of a large number of industries collected in the same year from a different number of establishments, it is probable that the averages of the two would be somewhat similar, provided the samples are large enough to be representative. Errors in a single industry will counteract those in another. Computations made on this basis using the 1903 figures for all industries give an average wage of $9.64 when the wages of 51,647 employees are used and $9.70 when 24,656 are included. The difference of two-thirds of 1% is so small as to be negligible.[1] Similar comparisons made in 1904 when two sets of wage data are available give a weekly wage for laborers in the car-building industry of $8.67 when 6,665 employees from 41 establishments are considered[2] and $8.61 when quotations of rates from 42 establishments employing 7,348 unskilled laborers are used.[3] In this case most of the establishments appear in each set of quotations although the difference is greater than the establishments figure would in-

[1] When the roughness of the statistical measure used is considered.

[2] *Bulletin 59*, p. 27.

[3] *Bulletin 65*, p. 30.

dicate. A comparison of all wage figures for unskilled laborers in that year based on the two compilations gives an average wage of $9.94 when figures for 88,416 employees are used and a figure of $9.91 for 66,942 employees. Similar comparisons in 1907 give a weekly wage in car building of $9.00 for 9,757 employees in 47 plants and of $10.14 for 4,671 employees in 20 plants. The difference here is, of course, too great to be reconciled and it is simply a question of choosing the more representative selection and of using it for the year's average, depending on the more representative figures in other industries and in succeeding years to counteract the error that is introduced.[1] A comparison of unskilled labor in all industries for which data have been assembled gives an average of $10.73 when wages of 112,617 employees are used and of $11.05 when the wages of 19,336[2] collected in a different investigation are considered.[3]

The data from 1907 to 1910 are drawn from identical establishments and so should be comparable. The scope of the investigation was extended in 1910 and much more extensive wage quotations secured. This extended survey was continued up to 1913. Here again the problem of comparability arises. For example, 20 establishments supplied data from 1907 to 1910. In 1910 figures were secured from 60 establishments. The reports give the results from both the 20 establishments and the 60 establishments investigated. In the first case the weekly wage is computed from the aver-

[1] It should also be noted that in one of these cases (the latter) the weekly earnings are computed on the basis of proper weighting and in the other case the figure available is simply the product of average full time hours and the average wage per hour.

[2] In the 19,336 many types of high paid unskilled labor are included, especially in the iron and steel industry. If they be excluded and only the more restricted "laborer" and analogous groups be used, an average of $10.74 for 17,852 employees is obtained.

[3] The methods of obtaining these averages and their relative value are considered in chapter iv.

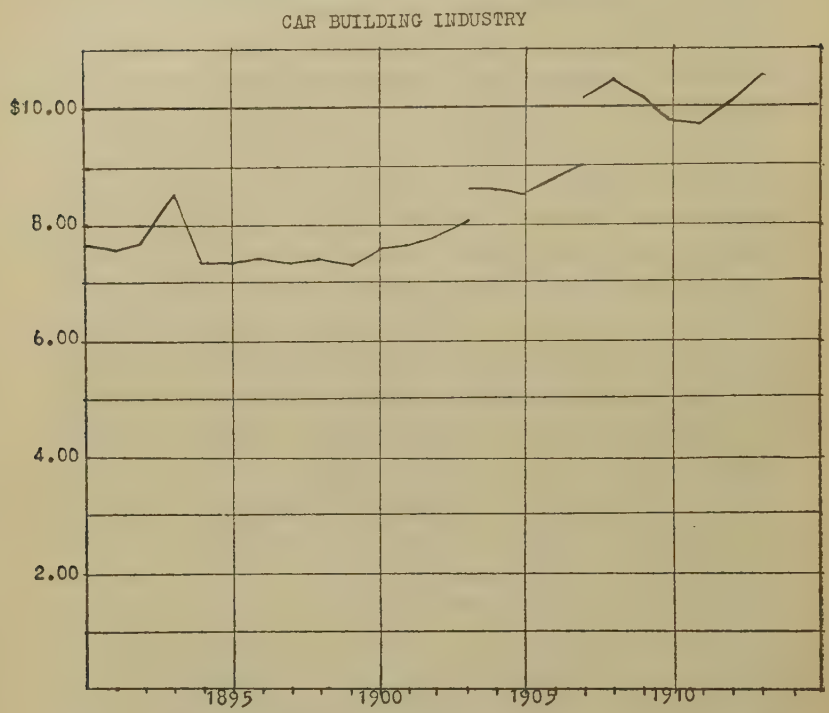
age full-time hours and the average wage per hour and is found to be $10.96 with the wages of 3,823 employees considered, while in the second case it is computed on a proper basis of weighting and is $9.78 with 10,114 represented, again a difference too great to be reconcilable. There is an indication of the possible incorrectness of the $10.96 figure in the fact that the 1909 figures from the same establishments give only $10.17 as the average weekly wage. Between that figure and the $9.78 one for 1910 the difference is small enough to make it possible to consider the figures usable. As has been already explained, whenever two groups of data are available for any year, other things being equal, the group giving the greater number of employees is preferred.[1] In 1911 quotations are given for 60 and 68 establishments with 7,695 and 8,001 unskilled employees respectively. The average wages here are exactly the same, $9.69, so no difficulties are presented. In 1912 with 68 and 72 establishments and 8,208 and 8,546 employees the averages are $10.02 and $10.04. These latter quotations show the possibility of using data covering somewhat, but not entirely, the same group of establishments for a year by year comparison. When the field covered is made more broad, that is, when a number of industries are included, the comparability of figures covering the whole range even if they are not collected from identical establishments each year becomes much greater.

The result, then, of the study of the wage of the unskilled in car building is shown in Chart 1. Through the first decade the weekly average wage remains almost stationary with the exception of the year 1893 when a remarkable increase took place and of the year 1894 when there followed an even more marked drop. From 1899 a gradual increase

[1] In computing the index number of unskilled labor, the link relative method is used to minimize the difficulties from incomparable data.

CHART I

WAGES OF UNSKILLED LABOR, 1890-1913



begins. The break in data makes years around 1903 and 1904 somewhat uncertain, but the general upward trend certainly continued to 1908 after which wages dropped steadily to 1911. In 1912 and 1913 the upward trend is again in evidence. Unfortunately no further data are available in the federal studies of this industry except for the year 1919 when the average actual weekly earnings amounted to $17.92.

The description of the sources of data in the car-building industry and the lack of strictly continuous and comparable data have been set forth in detail to give an indication of

some of the difficulties with which the study of the wages of the unskilled laborer has to deal. Such detail is hardly necessary for each of the industries presented. The source of the data will in every case be the federal Department of Labor's publications, supplemented by the National Industrial Conference Board's compilation since 1920. The average wage for each industry will be shown graphically and the figures presented in tables.[1] Descriptive matter will be confined to an attempt to describe the major trends and to explain or, where such an endeavor would be assuming too much, to point out the years when the data used are not strictly comparable. It will be noticed that those series of quotations that extend from 1890 to 1913 or beyond are examined first, and that next the short series, which often are of great value, are considered.

BLAST FURNACES

Figures for the wages of unskilled labor in blast furnaces were collected annually by the federal bureau from 1890 to 1915 and for the years 1917, 1919, 1920, 1922 and 1924. While this is only one branch of the iron and steel industry, particular interest is attached to the enumeration of the changes in wages paid in it because it is the only branch of that industry for which figures have been compiled back to 1890. For the earlier part of this study it will have to be taken as typifying the steel industry in general. It has been felt that the iron and steel industry is one in which the use of the "laborer's" wage alone gives a somewhat unfair picture of the condition of unskilled labor. So for the figures given concerning blast furnaces the data of the following six occupations are used from 1907 to 1924: stockers, bottom fillers, larrymen's helpers, keepers' helpers, cindermen, and laborers.[2] The resulting figure is higher than

[1] In the Appendix.

[2] *Cf. Bulletin 151*, pp. 37-41.

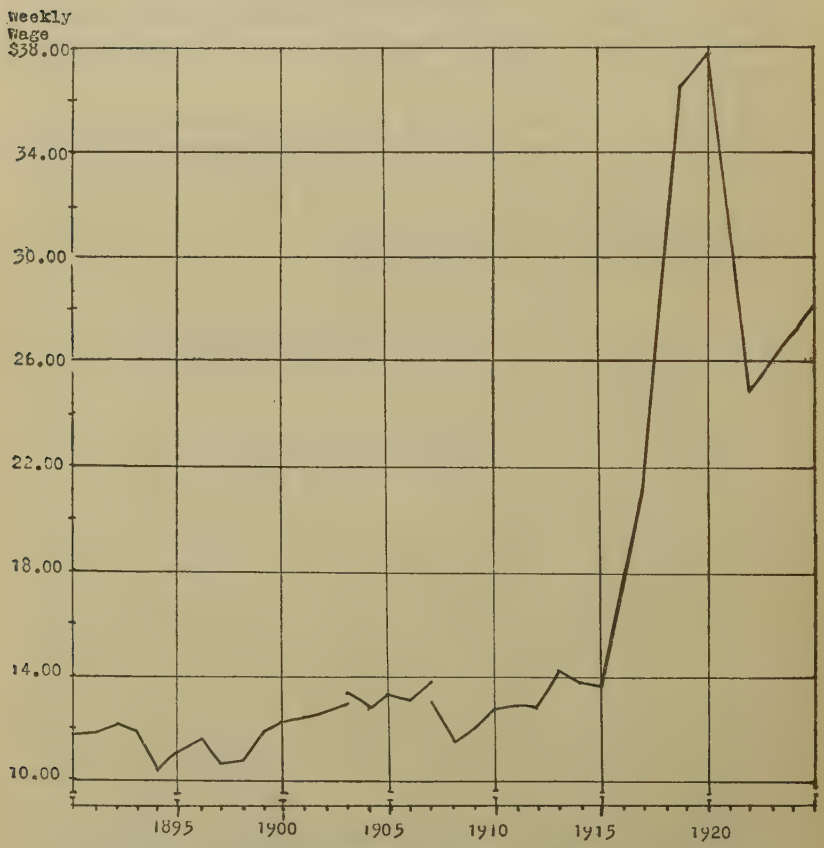
LIBRARY
SCHOOL OF BUSINESS

a figure giving simply the wage of laborers would be, but it is representative not only of the common floating gang laborer, but also of the more permanent class of laborer who also requires practically no skill. The result of this is an

CHART 2

WAGES OF UNSKILLED LABOR, 1890-1924

BLAST FURNACES



increase in the average wage and one which is more truly a description of the condition of the unskilled laborer in the industry that the common labor rate alone would be.

Chart 2 shows the course of wages of the unskilled groups in the blast furnaces of the United States from 1890-1924. The only especial comment required concerns years for which two levels are shown and those for which no data appear. In the latter case it is only necessary to remark that no data were collected in the industry by the federal department in 1916, 1918, 1921 and 1923. The unskilled figure of the National Industrial Conference Board for 1921 in this industry was $22.06 and for 1923, $26.60. The gap between the two wage averages in 1903 is small, the larger being slightly over 3% more than the smaller figure and the difference can be explained by the change of additional data that appears for that year in the computation of the $13.37 average. The difference between the two figures in 1907 is more serious. It is explained in two ways. First there is a large difference in the amount of data on which the two are based. The $12.99 figure is the average wage of 3,067 individuals, while the $13.76 figure is computed from 874 individual wage quotations. Then, the second figure is made up by taking the wages of cinder snappers, keepers' helpers, and top fillers, that combination being the nearest to a common labor group that could be found in the data prior to 1907. Figures for these occupations would necessarily be somewhat higher than those which include common labor and other unskilled work.

The general fluctuations of the blast furnace wage rates will be seen to be greater than those in car building. Special attention should be called to the sharp drop in 1894, to the small, but longer depression of 1897 and 1898, to the gradual increase to 1907, to the sharp drop in 1908, and to the more gentle decline in 1913 and 1914. The war increases and post-war decline with somewhat of a recovery by 1924 are indicated by the recent figures available, in spite of the lack of continuous data.

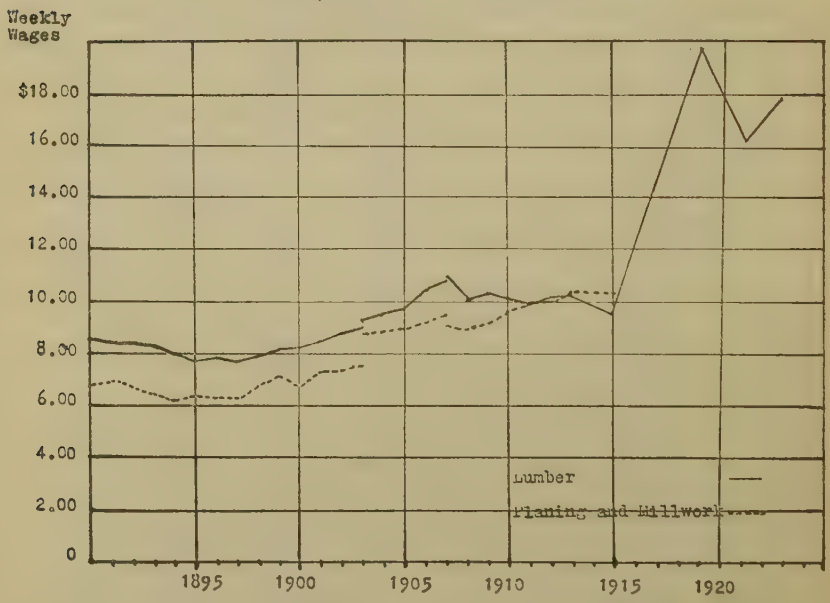
LUMBER, PLANING AND MILLWORK

The lumber industry will be considered along with the collateral industries of planing and millwork. Data for the lumber portion are particularly comprehensive for the years when they have been collected. Series of wage quotations are continuous from 1890 to 1913 and thereafter cover the years 1915, 1919, 1921 and 1923. For planing and millwork they are not so comprehensive and cover the years included in the lumber enumeration up to 1915. The distinction between the two series of figures which will be given

CHART 3

WAGES OF UNSKILLED LABOR, 1890-1923

LUMBER, PLANING AND MILLWORK



should be made clear. The lumber industry as the term is here used includes the entire process of turning the growing tree into boards. It includes lumbering and sawmill operations. When planing is carried on as a part of sawmill work

it is also included. The millwork figures are concerned with wages paid in those establishments that manufacture sashes, doors, blinds, frames, fixtures and building trim. It will thus be seen that the former group is by far the more important and so the more comprehensive figures are doubly desirable.

Chart 3 shows the variation in the wages of the laborer group in each of these related industries. Here again changes in the type of data presented appear in 1903 and 1907. There is also a large increase in the extensiveness of the lumber data in 1910. In 1907 the method of computing the weekly average changes, prior to it the product of the average full-time hours and the average wage per hour being used. The true average weekly wage is used for the years subsequent to 1907. The data for lumber for 1910 to 1915 give an excellent opportunity for examining wage statistics which are fairly extensive and which cover a varying number of establishments. The following table will be helpful in analyzing these figures:

TABLE 2

AVERAGE FULL-TIME WEEKLY EARNINGS OF LABORERS IN THE LUMBER INDUSTRY, 1910 TO 1915 [1]

Number of establishments	Year	Number of employees	Average full-time weekly earnings
245	1910	20,327	$10.12
	1911	19,256	10.10
299	1911	26,784	9.91
	1912	25,506	10.04
361	1912	29,365	10.03
	1913	28,835	10.40
324	1913	28,555	10.49
	1915	34,506	9.62
348	1915	36,569	9.58

[1] *Bulletin 225*, p. 8. (Extract from table.)

The inclusion in 1911 of over 7,500 additional wage figures only altered the average weekly wage $0.19, or less than 2%. In the following year the addition of nearly 4,000 wage figures altered the general average $0.01, an amount that is far too small to be considered. The two 1913 averages cover approximately the same number of laborers, but one is computed from wage rates of 361 establishments and the other from 324. The difference between the two is only $0.09, or less than 1%. Between the two 1915 averages there is a difference of 2,000 laborers and 24 establishments, but the average wages are only $0.04 apart, or less than one-half of 1%. The results of these tests are in no way conclusive, but they do tend to show that the data for this particular industry are sufficiently inclusive to be comparable even if the identical establishments have not in every case continued to supply quotations.

There is little in the general trend of wages of the unskilled in the lumber industry that needs extensive comment. The average declined from 1890 to 1897 and then began a gradual increase which lasted ten years. A sharp drop from 1907 to 1908 was succeeded by a period of fluctuations although the general trend was definitely downward to 1915. The few years that have been covered since then show that this industry followed the general war-time trend, the 1919 average being about 90% above that of 1913. A pronounced drop from 1919 to 1921, amounting to 17% of the 1919 average was followed by a partial recovery in 1923.

The figures for planing (to 1907) and for mill work (since 1907) are not as extensive as those for lumber. These branches of the industry are of course far less important. In 1903 a large increase in the wage rates included made a rather serious break in the data available. Here, as elsewhere, in the tables and computations the average wages of the greatest number is the one used. Chart 3,

however, indicates both averages. The break in 1907 is much less in amount and does not render the data for that year in any way incomparable with those which precede or follow it. Up to 1907 the general trend of the planing and millwork average wages follows the lumber industry fairly closely. The former industry, however, does not show the marked decline in unskilled wages in 1908, but has a generally, although very slowly, rising wage from 1907 to 1915, when data cease.

TEXTILES

The next industrial study has been entitled textiles and will be taken as representative of that important branch of American industry. Unfortunately the data to be used are much less extensive than the title would indicate and the justification for presenting the material rests partly in expediency, in the fact that the material is available and worth using, and partly in the fact that the particular branch of the industry which is used as a representative of the whole is a type that uses almost exclusively unskilled labor and which has not changed to any great extent in the last thirty-five years.[1] Many other occupations in the ordinary textile mill properly come within the definition which has been adopted in this study for unskilled labor. The difficulty that has been met in attempting to follow them through the period studied has been so great that no attempt is being made to present figures for them. Finally in the dyehouse and bleachhouse work of the textile mill male labor is used exclusively. In most of the other unskilled branches female labor is more important than male.

In attempting to carry back to 1890 a wage average for the dyehouse and bleachhouse workers, data have been found that refer almost exclusively to the cotton industry. For the latter part of the period the silk industry can be included

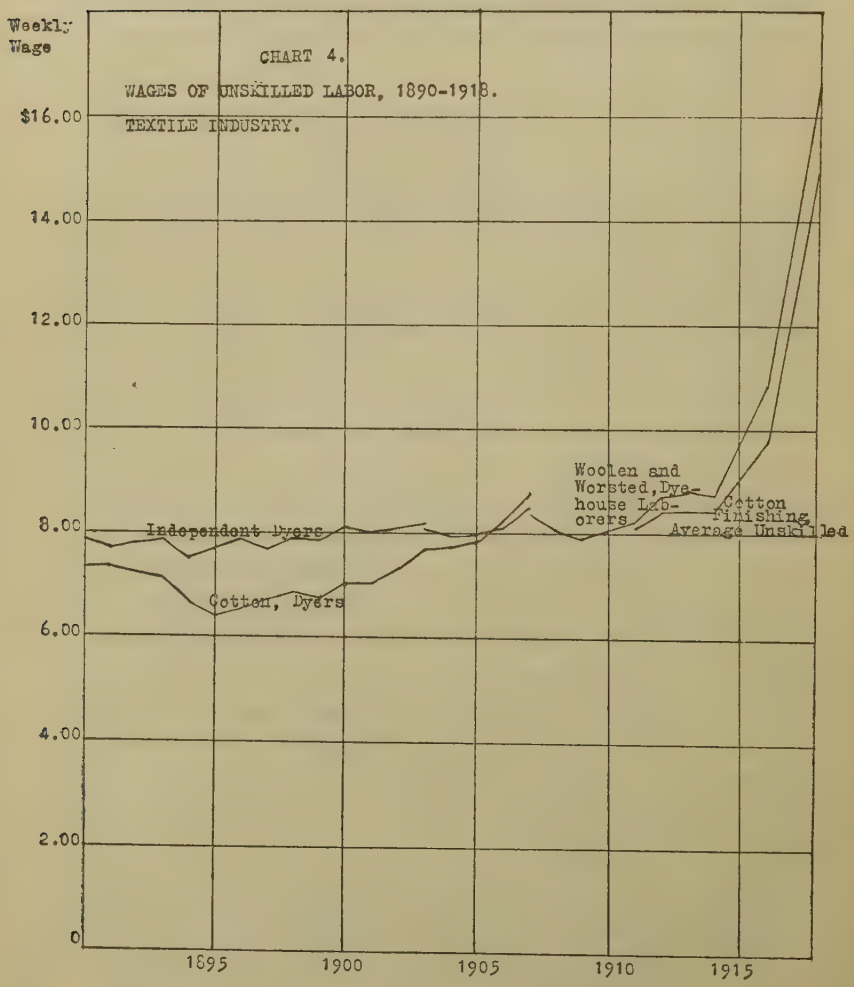
[1] Selekman, Ben M., *Sharing Management with the Workers, passim.*

and for the earlier part wages are given for independent dyers, as well as for dyers in the cotton industry. From 1907 on the wages of dyehouse laborers in the woolen and

CHART 4

WAGES OF UNSKILLED LABOR, 1890-1918

TEXTILE INDUSTRY



worsted industry are also presented. For all the years except 1922 and 1924 for which data exist two sets of wage figures are available and for a few of the years four separate figures may be compared. It will be significant to compare the variations in the wages of workers in these closely related industries and to see if they seem to follow any definite trend. They are shown in Chart 4. In addition to the wages of dyehouse laborers, an average for the cotton industry made from wage figures for certain of the unskilled machine occupations [1] and one from the woolen and worsted industry [2] computed in the same way are presented. The woolen and cotton figures are perhaps homogeneous enough to be suitably weighted and used as an unskilled textile average. Consideration of such combination will, however, be postponed until the following chapter.

Except for the fact that no cotton finishing (dyehouse laborers) figures were compiled for 1908, 1909 and 1910, the series included in Chart 4 are sufficient to give a fairly accurate history of wages of unskilled labor in the textile industry. An examination of some of the variations indicated is of interest. The first distinct trend that can be discerned in the two series that run through the nineties is the drop from 1893 to 1894. From 1895 both series show a gradual increase to 1907. This increase is broken in the case of each group by occasional slight declines, notably in 1899. As has been pointed out, it is impossible to trace through the years 1907 to 1911 the particular occupations that have been used in the earlier years. A substitute is devised by using the wages of dyehouse laborers in the woolen industry. Justification for such substitution lies mainly in

[1] The occupations used in the cotton industry are card strippers, drawing tenders, and fine speeders.

[2] The occupations used are card tenders, comber tenders and drawing frame tenders.

necessity, but there are tests which indicate that accuracy is not greatly sacrificed. In the first place the 1907 figures for the two cotton series and for the woolen series are within $0.38 of each other. One cotton average is one and one-third per cent and the other four and one-half per cent above the woolen average. From 1911 through 1918 there appears to be a marked similarity between the amounts of the cotton and woolen averages. Finally an average of dyehouse laborers in the silk industry has variations which are practically the same in direction as those of woolen laborers. These tests do not, of course, mean that during the years 1907 to 1911 the cotton average lay close to the woolen, but they do increase the probability that such was the case. Using then the woolen average as indicative of the variation in the unskilled textile wage from 1907 to 1911 there is observed a drop in 1908 and 1909 followed by a recovery which lasted until 1913. The cotton average which is recommenced in 1911 follows the woolen quite closely. From 1913 to 1914 a slight drop is recorded for each. In the latter year each starts on its war-time climb. The cotton figure is discontinued after 1918 and reliance must again be placed on the woolen. 1920 is the peak year so far as there are available figures, 1919 and 1921 being among the years when no statistics were available. The 1922 average records a drop of 22% from the 1920 peak, and the 1924 figure a recovery amounting to slightly less than one-half of the amount of the decline in 1922.

BUILDING INDUSTRY

In the building industry wage data for laborers were collected from a large number of establishments employing an ample number of men. In 1890 there were 146 establishments from which data for 5,118 laborers were recorded. In 1903 the number of establishments was increased to 172,

the laborers to 5,932. There was a further increase by 1907. The data in this form end at that date. The trend of wages of the unskilled in this industry may be followed in the Bureau's bulletins entitled "Union Scale of Wages and Hours of Labor,"[1] where the wage rates of building laborers who are members of trade unions are recorded in detail. The method of recording these wages is somewhat different from that used in reporting the others and so more detailed explanation must be made. The figures that are collected are the rates of pay per hour and the full-time hours of labor for each city investigated. From these a full-time weekly wage is computed. In the Bulletins an index number for the occupation is computed by weighting each wage rate by the number of laborers to which it applies and finding the average. Where data are given for a large number of cities, it may be questioned whether such weighting is of any greater value than a simple average of the wage rates of each city.[2] Use is made of the index number computed by the Bureau of Labor Statistics in conjunction with the quotations that were carried through to 1907. This particular series is of great interest because it is an unskilled laborer series for which annual quotations are available up to the present time.

A number of cautions are necessary before using it. The wages from 1907 on are union wages. They doubtless average rather higher than the general wage rate in the building industry. On the other hand it will be found that the rates given are in the main minimum rates and those actually paid are often more than those recorded. The hours are in general maximum, although they probably are much nearer to the actual time worked than are the wages

[1] *Bulletins 131, 143, 171, 194, 214, 245, 259, 272, 286, 302, 325, 354.*

[2] *Cf. 19th Annual Report of the Commissioner of Labor*, pp. 22-24, comparison of weighted and unweighted averages.

to the amounts paid. Overtime is not included in the quotations that can be given. In the building industry it is more than counteracted by short time in winter. It may be stated then that the wage rates recorded in this industry are perhaps slightly lower than the actual full-time union wage rate and somewhat higher than the actual non-union rate. In any event their annual fluctuations will give an excellent indication of the general changes in compensation of building laborers. The data are collected widely through the country and at a definite time each year.

Because both of the importance of the industry and of the homogeneity of the data presented, an examination of their fluctuations is of more than usual interest. A slightly downward trend from 1890 to 1896 was followed by a fairly stationary wage to the end of the decade. An increase of considerable importance from 1900 to 1901 began a general rising tendency which has continued with only a few exceptions to appear every year since then. The period from 1907 to 1915 should be characterized as one of only slight increase. The really sharp rise in wages began in 1916 and continued to 1920. A very slight increase in 1921 was followed by an important decline the subsequent year. 1923 brought a slight increase, and was followed by an important one in 1924, the last year covered by the survey. It should be recalled that there is a definite change in the type of data used in the survey, union wage rates only being used after 1907. The variations in the wages of building laborers are shown graphically in Chart 5.

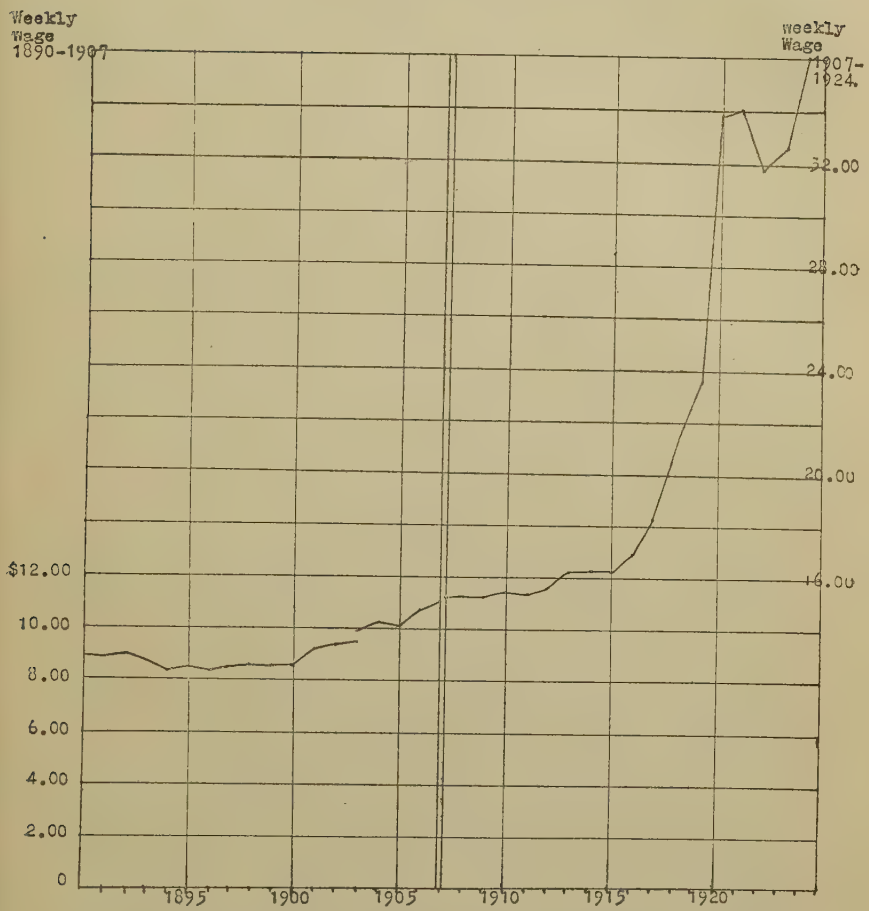
WAGE SERIES TO 1907

This concludes the examination that is to be made of the wages of unskilled laborers in individual industries for which it is possible to present fairly continuous wage data gathered by the United States Bureau of Labor Statistics from 1890

CHART 5

WAGES OF UNSKILLED LABOR, 1890-1924

BUILDING LABORERS



to 1913 or beyond. Much data, as has been said, exist in the form of discontinuous series. A short description of the amount available will follow. The use to which such data are to be put and their general value as indicators of the general trend of unskilled labor will be considered in the

next chapter. Attention should also be called to the fact that consideration of the wages of unskilled labor in transportation and in agriculture is being postponed for a later chapter. The present study is directed toward the manufacturing industries and an attempt will be made to present definite conclusions concerning those industries before others are discussed.

The wage data from 1890 to 1907 are much more homogeneous than those subsequent to the latter date. This does not, of course, necessarily mean that they are more representative or that they present a more accurate picture of conditions as they existed. Other things being equal, however, the greater the homogeneity of the data the more accurate an historical study will be. The purpose of the next few pages is to describe these data and to indicate the degree to which they may be considered representative of unskilled wage figures of the years covered. The figures mentioned are listed in Tables A to C [1] where for each industry, in addition to the wage per week, the number of establishments covered and the number of employees in those establishments are listed.

The brick industry was a subject of the Bureau's investigations from 1890 to 1907. The number of establishments, 11 in 1890, is comparatively small and the number of unskilled employees, 286 in 1890 to 367 in 1903, not sufficient to be considered satisfactory. By 1907 the investigation of the industry had been placed on a broader basis and 54 establishments and 1,506 laborers are included. If these establishments are widely enough distributed over the country the data are probably ample enough to be representative. In the Census of 1900 this industry is credited with 49,933 employees.[2]

Data of wages of laborers in the flour industry were col-

[1] In the Appendix.

[2] *12th Census of the United States, 1900, Occupations*, p. xlii.

lected from 1890 to 1907. Only 7 establishments employing 143 laborers are covered in the data of the first thirteen years. In 1903 the number of establishments is increased to 31 and the laborers to 998. While the number is further increased in 1907, the small importance of the laborers in the flour industry and the fact that data stop with 1907 make a detailed study of the rates unnecessary. The data are ample enough from 1903 to 1907 to be considered representative. In the earlier years the small number of establishments from which they are collected lays them open to suspicion.

It is unfortunate that the data gathered from foundries were not continued beyond 1907. The earlier investigations of wages in foundries covered a wide range of establishments and a large number of laborers. The number of establishments included in 1890, 128, was exceeded in that year only by those that contributed to the figures for the building industry. Unskilled employees whose wages were collected in that year numbered 3,651. By 1907 the establishments covered numbered 211 with 9,858 unskilled laborers. The only other official figures for unskilled workers in foundries were collected in the Industrial Survey of 1919.[1] Here wage rates of 5,031 unskilled employees (laborers) in 144 establishments are summarized. If it were possible to link the 1907 data up to those of 1919 and to continue the latter to the present, an additional valuable wage series would be secured.

Three industries in Table A may be dismissed with little mention so far as the years up to 1903 are concerned. Two establishments each in the glass and distilled liquor industries and three in the gas industry give figures that if taken alone are apt to be highly misleading. Taken in conjunction with other industries they may have some

[1] *Bulletin 256*, pp. 220-221.

small significance. From 1903 no figures in the distilled liquor industry are compiled. For the five years, 1903-1907, both the glass and gas industries are represented by an adequate number of establishments and employees to give figures which are in themselves of some significance. Their chief fault lies in the fact that they are not continued on from 1907. The glass industry does appear in the 1919 survey,[1] but inability to continue the trend of wages through the intervening years makes these later figures of little use for the purpose in hand. In 1907 in the glass industry 30 establishments contributed figures concerning 1,564 common laborers. In the 1919 survey there were 67 establishments and 2,006 laborers.

The marble industry is a relatively unimportant industry which has been covered by official wage statistics in a fairly adequate manner. Data presented range from 18 establishments and 214 laborers in 1890 to 124 establishments and 1,154 laborers in 1907. If other industries had been as adequately covered as this, and their data extended beyond 1907, there would be little difficulty in carrying through this investigation.

Up to 1903 the paper and pulp industry is represented by only 4 establishments employing from 150 to 225 unskilled laborers. The figures for the industry become more satisfactory from 1903 to 1907, being collected from 16 to 28 establishments employing in one year as many as 1,314 unskilled employees. From 1907 to 1919 no official data on wages in the industry are available. The 1919 survey[2] examines wage data for the industry but the laborer group is not included in the list of groups whose wages are examined. Certain of the distinct occupations that require little or no skill give some indication of the trend of wages

[1] *Bulletin 256*, p. 249.

[2] *Bulletin 256*, pp. 424-439.

in that year. Eighty different establishments contribute these data. In 1925 the Bureau published a study of wages and hours in the industry in 1923.[1] This is in the form of the intensive examinations that are now being made of a number of industries at two-year intervals and it may reasonably be expected that it will be continued in 1925 and later. Some 199 establishments employing 8,439 unskilled laborers are covered by the figures that have been compiled.

The soap and rope industries for which figures are presented from 1890 to 1903 are relatively unimportant and are represented by so few establishments that they may be dismissed with only this slight mention.

The shipbuilding industry is poorly represented in the figures collected from 1890 to 1903, but fairly well covered from 1903 to 1907. In the first period only three establishments present data while in the second they are gathered from 17 to 35 employing as many as 4,306 common laborers. The fact that the second period is fairly well covered makes it desirable to consider the earlier figures even though they are quite inadequate. It is particularly unfortunate that this industry was not examined by a well-organized study of wages at regular intervals through the war years. Much of interest to the economic and social theorist as well as information of immediate practical use could have been derived from such a study. Much wage data from official sources for the industry may be compiled from the various reports of wage-adjustment boards during the war but such information does not fill the place of the regularly collected information that has been suggested above.

The figures for the slaughtering industry also start with so few establishments that they may be properly considered unrepresentative. From 1890 to 1903 only four establishments with from 3,785 to 6,360 employees are included.

[1] *Bulletin 365.*

Thirteen to fifteen establishments supply figures from 1903 to 1907 for 9,865 to 11,288 employees. No official figures are available from 1907 to 1917 when the Bureau again made a study of the industry. Such studies were also made in the years 1921 and 1923. The last three studies were of the more intensive single industry type and cover the industry in a satisfactory manner. The often repeated criticism of lack of continuity applies to this industry as to so many others. There is, of course, a value derived from an intensive study of any industry in any particular year, but the value is immensely increased if studies of industries are carried on year after year in such ways that the results will be comparable. The present Bureau of Labor Statistics realizes this and is attempting to adjust its work accordingly. It is to be hoped that the state departments of labor will more generally appreciate this fact and arrange their surveys in a similar manner.

The wages received by laborers hired by contractors to work on streets are recorded from 1890 to 1903 in 30 different places, and the laborers concerning whom information is presented number well over 3,000, through the whole period. In 1903 the number of places represented is increased to 70 and the laborers to over 8,000. By 1907 there are 131 places represented by 14,072 laborers.

Along with this series should be presented one referring to laborers employed by municipalities. It is to be expected that such wages will be higher than those paid by private employers. Whatever may be said of the policy of governmental bodies in paying their clerical and professional employees, the practice of paying unskilled government employees as much as, or more, than the prevailing rate seems quite common.[1] For that reason such wage rates have often

[1] Cf. "Rates of Wages paid under Public and Private Contract," Ethelbert Stewart, *Bulletin of the Department of Labor*, no. 74, p. 791 *et seq.*

been disregarded by investigators as not being representative. There seems little justification for entirely disregarding them. They represent a rate of remuneration received by a large number of unskilled workers. They are determined, no doubt, partly by political rather than by economic factors, but underlying the politics involved is the deeper and perhaps more important general trend of wages which, if it is not partly determined by them, will at least be recognized as a highly important determining factor in deciding the level at which they will rest. It may be contended that they do play a part in determining this general trend. Laborers, even in the unskilled group, in the more prosperous periods of the business cycle set certain standards, below which they will at least hesitate, i. e., look for other jobs, to work. If the wage paid by the municipality or the state is set at a certain level it tends to create a standard to which, when jobs are plentiful, the laborer will compare his wage, and if his pay falls below that standard, he is apt to attempt to better it by getting other work. It may be argued with some reason that this presupposes on the part of the laborer more knowledge than the general run possesses. While it must be admitted that the common level of knowledge of outside working conditions of the average unorganized worker is low, he does usually possess some idea of what is being paid at other jobs in his immediate vicinity. His information often is very scanty even on this subject and much of it probably is not true. The fact that the city pays road laborers three dollars a day when the ordinary factory unskilled laborer is getting two dollars or two dollars and a half will not be long in becoming common knowledge. The further fact that the city work on the roads lasts only from April to November will be less well known and if the city is hiring many men the factories are apt to find their stock of unskilled labor being reduced. The interaction of all eco-

nomic phenomena on one another is perhaps a sufficient theoretical basis for justifying the inclusion of this wage rate, but the grounds for using it have been set forth more in detail because of the commonly expressed opinion that such wages are not fair criteria of the level of pay of a single group. An analogous argument would not apply to clerical or professional wages of government employees, for there other advantages are supposed to be coupled to the dollars and cents of salary that are paid.

Street laborers in municipal employ are covered by the official data that are available from 1890 to 1907 in a fairly comprehensive manner. From the point of view of actual employees whose wage rates are recorded their number exceed those of any other group. There are 47 localities covered in the earlier years of the period and the number of laborers varies from close to 9,000 to over 10,000. From 1903 on the localities and laborers are both increased in numbers, 72 localities with 28,179 employees being covered in 1907. When the weekly wage figures for the two groups of street laborers are compared, it will be noticed that the actual weekly pay of the group in the employ of contractors often exceeds that of the group in the employ of municipalities. The chief reason for this lies in the difference in working hours. A comparison of wages per hour shows an advantage to the municipal employees in almost every case.

The remaining figures that are used in the study of unskilled labor prior to 1907 are not definitely designated as laborers' wages. They are drawn from three industries and represent specific occupations in those industries which may be considered practically unskilled. The use of the wage of dyers in the cotton industry has already been justified. Wages for the same group in the carpet industry are to be used. Some error is possible because of the fact that the

more skilled supervisors of the dyeing work are sometimes included. The great majority of employees engaged in this particular sort of work are unskilled and the whole group fails to show an average wage higher than the general unskilled average. The number of establishments covered in the carpet industry is small, amounting to only six through the whole period 1890 to 1907. The number of employees is around 200. The importance of the industry is small and the numbers included are probably as fairly representative as are the much larger number of wage rates used in other industries. From 1904 to 1907 another occupation in the industry, that of ingrain weavers, is added to the dyeing group in the carpet industry. This is the lowest grade of semi-skilled work in the recorded figures and because of female competition is paid wages that put it in the unskilled classification.

The leather industry is represented by a group which in the 19th Annual Report is referred to as tanners. It is explained in a later publication of the Bureau of Labor that this group "handles hides at the vats and in the yards" and is more properly referred to as tan-yard hands.[1] The designation tanner as now used refers to the more skilled supervisors of the tanning operation. The designation tan-yard hands is equivalent to the term tannery worker used by the Bureau in its descriptions of occupations prepared for the United States Employment Service. Skill or experience are not required for such work.[2] In the period from 1890 to 1903 data for between 400 and 500 laborers in 19 establishments are presented. These are increased by 1907 to 925 laborers from 60 different establishments.

Finally in the earlier period the tobacco industry is repre-

[1] *Bulletin 59*, p. 41.

[2] *Descriptions of Occupations; Boots and Shoes, Harness and Saddlery, Tanning*, U. S. Department of Labor, 1918, p. 69.

sented by figures of a small number of cigarette machine operators from two establishments. This group is an example of the unskilled machine tender. The number by which it is represented in the survey that can be made here is even smaller than the importance of the industry which itself would not rank high among the industries that are being considered.

WAGE SERIES SINCE 1907

The change in the type of study from which information must be drawn for the years after 1907 has already been mentioned.[1] The industries from which data are drawn are fewer in number, and not as representative of the whole range of unskilled labor, but the thoroughness with which wages in each industry are examined is much greater. The country as a whole is much better covered in these later surveys. For the years from 1907 to 1913 the data are as a whole more satisfactory than for the years 1890 to 1903 and probably about equal to what are available in the years 1903 to 1907. This comparison, it should be recalled, refers only to the data relating to unskilled labor. The individual studies made since 1907 are great improvements in method, content, and manner of presentation over the earlier ones.

The data that are used in computing a general average of the wages of unskilled labor in 1913 will be described. It is not necessary to consider the industries from year to year. Unless otherwise mentioned, data for them are continuous from 1907 to 1913. The intervals at which they are available beyond 1913 will be mentioned as each separate industry is described. It will be recalled that the data for car building, blast furnaces, building, lumber and mill work and the textile industries have already been described.[2] It is

[1] *Supra*, p. 28.

[2] *Supra*, p. 42 *et seq.*

only necessary now to describe contributions from other industies that help to make clear the whole situation.

In the woolen industry the variations in the wages of dyehouse laborers have been described. Two other occupations for which data are supplied, those of card tender and comber tender, require little in the way of skill. Ordinary strength and ability seem to be the main requisites.[1] The wage paid in general is below that paid the dyehouse laborers. Data in 1913 concerning the wages paid card tenders are secured from 40 establishments employing 329 employees in this occupation. For comber tenders the data come from 9 establishments employing 115. While these numbers are much smaller than those of the dyehouse laborers for which data have been presented it is felt that the adding of two other occupations will make the whole figure more truly representative.

Data concerning the iron and steel industry have been extensively collected. Those from blast furnaces have been described.[2] By 1913 the Bureau collected similar wage figures from bar mills, bessemer converters, blooming mills, plate mills, open-hearth furnaces, standard rail mills, sheet mills and tin-plate mills. In many of these branches of the industry the number of establishments covered is rather small, with a consequent small number of employees. For all except the first two mentioned data are available only from 1910. If the industry were one of less importance it might be acceptable to assume that the blast-furnace figures are representative of the whole and to omit consideration of the other branches. The importance of the industry, however, seems to merit a more extensive examination and so data are presented when available for certain unskilled laborers

[1] *Descriptions of Occupations, Textiles and Clothing*, U. S. Department of Labor, 1918, pp. 54 and 56.

[2] *Supra*, p. 49.

in each branch. As was suggested in connection with the discussion of employees in the blast-furnace branch of the industry, there are many occupations which are given a distinctive name but which require little or no skill.[1] Employees working at these occupations receive little more per hour than regular common labor, but the hours are apt to be longer and the work more regular, so the weekly rate is more. To describe unskilled labor and omit these groups would convey a false idea of the wage level in the industry.

In each division of the industry a laborer group, always the largest of the occupational groups considered, is included. Other occupational groupings will be described in each of the separate subdivisions of the industry except the blooming-mill and plate-mill divisions, which are represented only by laborers.[2] For the bessemer converter group stockers, cinder pitmen, bottom-makers' helpers and ladle-liners' helpers are included in the number whose wages are recorded. Stockers and cinder-pitmen do manual work of a hard and, particularly in the latter occupation, often dangerous character. Bottom-makers' helpers are on the dividing line between the skilled and the unskilled group. The work of a bottom-maker requires considerable experience and much care. The helpers do manual work under his direction. To some extent these helpers may be considered apprentices and so not within the definition of unskilled labor that has been adopted. On the whole, however, only manual labor is necessary and so wage data for the occupation are used. Much the same description would apply to the work of the ladle-liners' helpers, although the work of a ladle-liner is perhaps not quite as exacting as that of a bottom-maker. It is apt to have to be done under more severe conditions.

[1] *Bulletin 168*, p. 14.

[2] The glossary of occupations, *Bulletin 218*, pp. 467-526 is drawn on more heavily than any other source for the occupational descriptions that follow.

In the open-hearth furnace branch of the industry data concerning the wages of stockers, third melters' helpers and switchmen are included along with those of laborers. The work of stockers is of much the same character as in bessemer converters. It consists of unskilled labor varying in difficulty and severity. The third melters' helpers do "unskilled work, in which considerable strength and endurance frequently are called for." [1] The switchmen couple and uncouple cars and throw switches, all work which requires no particular training.

The special occupations included in the wage rate for the standard rail mills are hot-saw men's helpers, hot-bed men and cold-saw men's helpers. All of these involve only manual labor of an unskilled, but often of a heavy character.

The list of special occupations that are combined to obtain the bar-mill averages includes stockers, chargers and helpers, hot-bed men, shearmen's helpers, and bundlemen. The work of the stocker is of a heavy manual character consisting mainly of loading and unloading billets. Chargers and helpers put the billets into the heating furnace under the direction of the heater. Hot-bed men are mainly lever operators and require in general little skill or experience. The work of the shearmen's helpers is classed as light, unskilled manual work. The work of bundlemen is frequently done by shearmen's helpers and requires no skill or extraordinary strength.

In sheet mills, shearmen's helpers, openers and picklers are grouped with the laborer class to give an unskilled wage average. The work of the shearmen's helpers is rather heavier than the work to which a similar designation is given in bar mills. It requires no skill. Openers tear sheets apart with tongs. Their work is perhaps on the border line between skilled and unskilled. In general it requires strength

[1] *Bulletin 218*, p. 483.

rather than training. The work of pickler requires some skill, but it is mainly mechanical and its high pay level seems due largely to its disagreeable character.

Shearmen's helpers' and branners' wages are used with those of laborers to derive the tin-plate average unskilled wage. The shearmen's helpers' work is similar to that in the same occupation in sheet mills. Branners apply a mixture to plates in order to clean them. Their work is light and requires little in the way of skill or training.

The occupations that have been designated in the various branches of the iron and steel industry as requiring little or no skill are not the only ones that could be included in that general description. They are, however, ones for which data are available and which do to a considerable extent represent the better-paid unskilled workers of the industry. No further justification for their use seems necessary. From 1910 to 1915 data are published for all the branches of the industry. For 1917 figures are supplied for all except bar mills and tin-plate mills. The 1919, 1920, 1922 and 1924 reports cover all branches of the industry.

For 1914, 1915, 1919, 1920, 1922 and 1924 data for stockers, bloom boys, hot-bed men, shearmen's helpers, and laborers are collected from a large number of puddling mills. Occupations designated by all these names except bloom boys have been described in connection with other branches of the industry. Bloom boys are always adults and perform work which requires practically no skill and which consists of taking the bloom from the squeezer to the rolls.

The cotton industry is represented in the figures from 1907 by three occupational classifications in addition to those that have been already mentioned in the cotton-finishing branch. These groups are card strippers, drawing tenders, and fine speeders. The first two of these require the ability to tend, but not to set up, machines that are quite simple to

operate. Ordinary strength and ability form the chief qualifications necessary for such workers. The last occupation is classed by the Department of Labor in the general worker class of the cotton-cloth industry, i. e., it involves tending a simple machine and does not require any particular training.[1]

It has been difficult to find satisfactory data for the boot and shoe industry. Two occupations of those included in the Bureau's surveys have been chosen as representative of it, although perhaps more than any others used they are in the semi-skilled group. These occupations are designated as hand pullers-over and treers and ironers. The puller-over assembles the last with the insole tacked on it, the counter, and the upper. He draws the upper over the last and insole and drives tacks to keep the upper in position for the laster.[2] The treers and ironers do polishing and finishing work on the shoes, a type of work that requires no skill and little practice.

Hosiery and knit goods forms the final industrial classification to be considered here. The two occupations that can be used to show the trend of wages in the lower paid groups in the industry are those of boarder and presser. The use of these may be objected to on the ground that they require somewhat more strength and endurance than does that of the ordinary "general worker" in the industry.[3] The justification is the common one of expediency. Figures for these two occupations are available and there are none for the general workers as a group. In the case of the boarder

[1] U. S. Department of Labor, *Descriptions of Occupations, Textiles and Clothing*, p. 25.

[2] *Bulletin 233*, p. 143 and U. S. Department of Labor, *Descriptions of Occupations, Boots and Shoes*, p. 43.

[3] U. S. Department of Labor, *Descriptions of Occupations, Textiles and Clothing*, pp. 60, 62.

figures it may be argued that the hand boarder belongs in the semi-skilled group. It is admitted that such workers are on the border line, but they comprise only part of those represented by the figure given and it is felt that a fairer average will result if they are included than could be derived from figures concerning pressers alone, as the latter group is comparatively few in numbers.

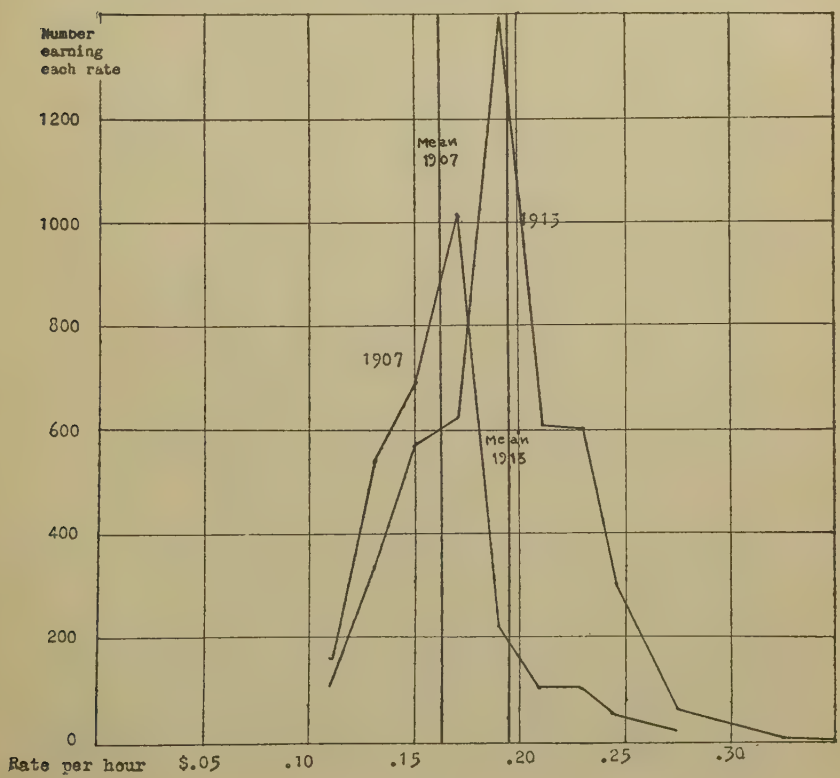
CHAPTER IV

Index Numbers of the Money Wages of Unskilled Labor, 1890-1924

The next step in the analysis of the movement of unskilled wages in the United States is an attempt to combine the data that have been described in the preceeding chapter

CHART 6

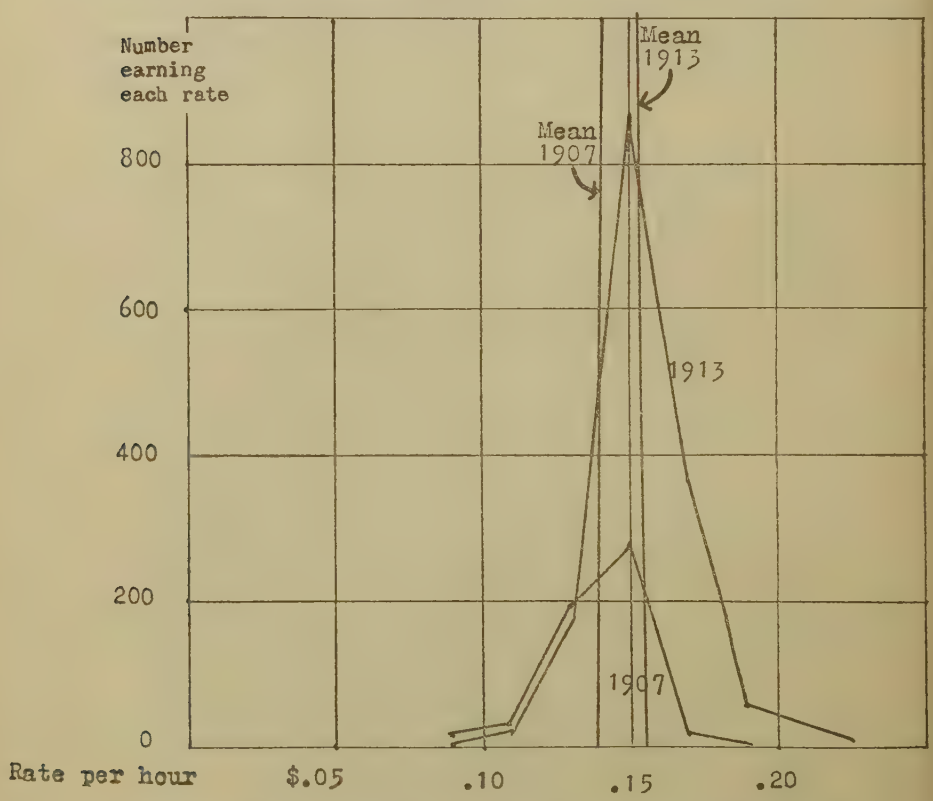
Earnings Per Hour of Unskilled Labor in Blast Furnaces 1907 and 1913



into a series of index numbers which will portray with a fair degree of accuracy the trend of wages of this group during the period covered. The present chapter will set forth first

CHART 7

EARNINGS PER HOUR OF UNSKILLED LABOR IN THE WOOL AND WORSTED INDUSTRY, 1907 AND 1913

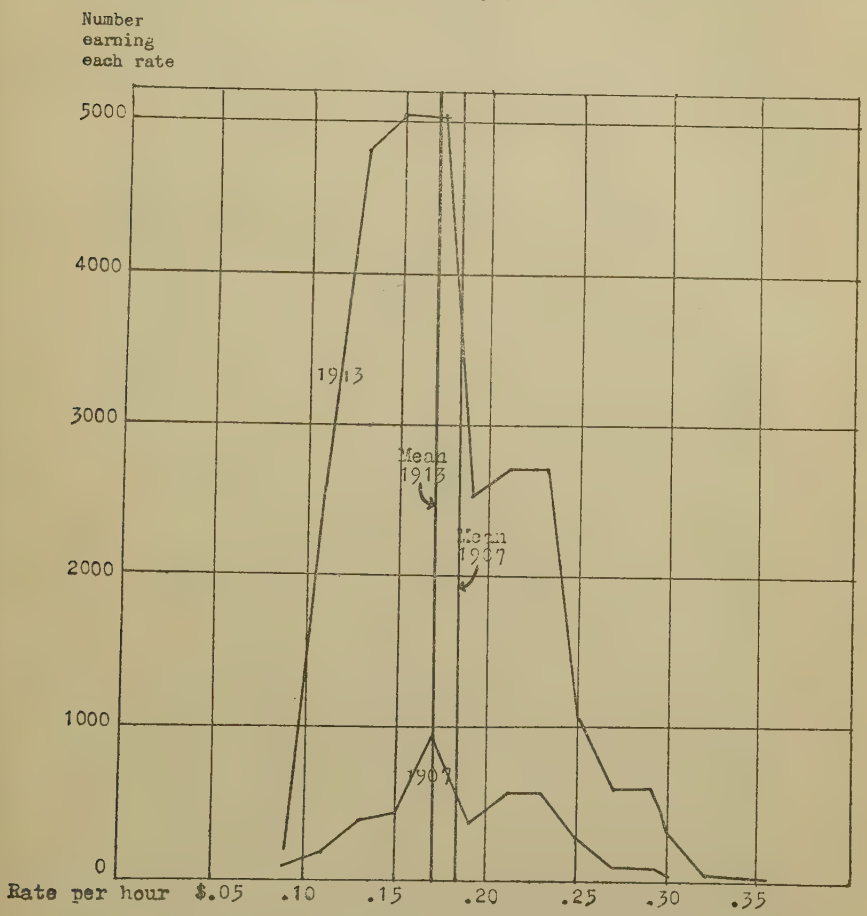


the value that such index numbers may have if they can be computed. Then various methods of computing a wage index will be considered. The most accurate use that can be made of the data available will determine the form that

is selected. After the results of the computation have been

CHART 8

EARNINGS PER HOUR OF UNSKILLED LABOR IN THE LUMBER INDUSTRY
1907 AND 1913



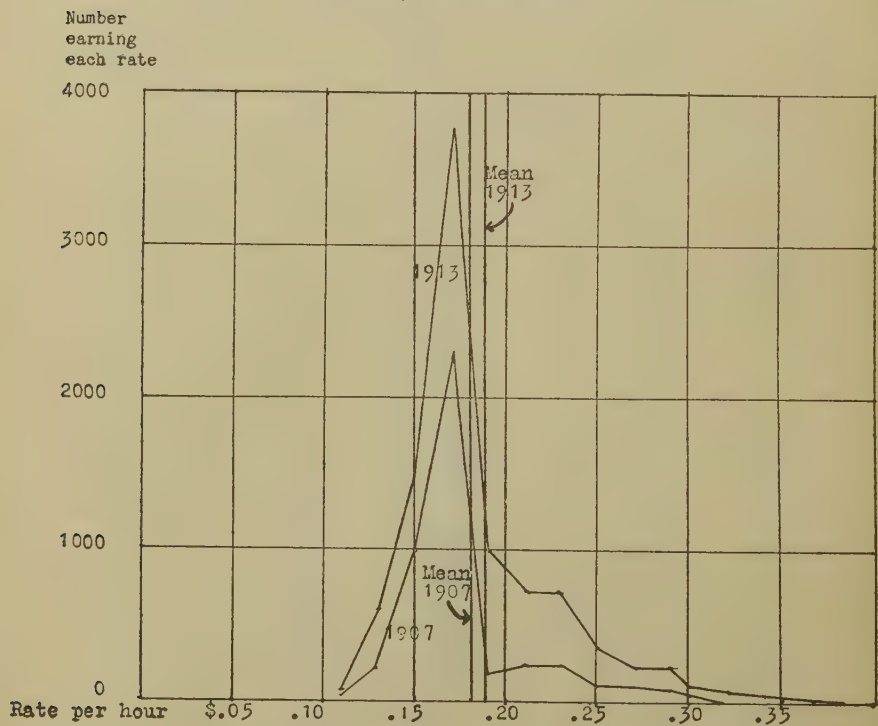
set forth, they will be compared with index numbers of the wages of unskilled employees in other than the manufacturing industries.

THE VALUE OF AN INDEX OF UNSKILLED WAGES

An index number of unskilled wages must be based upon some sort of an average of such wages. Hence before the value of an index relating to a series of averages of wages

CHART 9

EARNINGS PER HOUR OF UNSKILLED LABOR IN THE CAR BUILDING INDUSTRY, 1907 AND 1913



can be understood, some attention should be paid to the meaning, or to the lack of meaning, of an average wage and especially to the form of average to be used, the mean. The misleading character of such an average has been described earlier.[1] Unless these limitations are kept clearly

[1] *Supra*, p. 40.

in mind the conclusions that are drawn will be erroneous. It was seen that the use of an average wage for unskilled labor within an industry did not involve the chance of error that the use of most wage averages involves. The range of unskilled wages in general within any particular industry is small. Proof of this cannot be offered by using data of weekly wages in the form in which they have been presented above, but Charts 6 to 9 show the distribution of wages paid per hour in several industries for which the data are fairly ample in 1907.[1] It will be seen from these charts that most of the wage rates lie around and close to the arithmetic mean. In order to show that the situation in 1907 was not an abnormal one, data for the same industries for 1913 are presented in Charts 6 to 9. A comparison of the average wage per hour in each industry for each of the two years and a comparison of the distribution of actual wages about those

TABLE 4

COMPARISON OF AVERAGE WAGE RATES PER HOUR AND THEIR STANDARD DEVIATIONS FOR 1907 AND 1913

Industry	Year	Average Wage Rate per Hour	Standard Deviation
Blast Furnaces	1907	$.162	$.030
	1913	.194	.036
Car Building	1907	.180	.045
	1913	.189	.056
Lumber	1907	.188	.044
	1913	.176	.046
Woolen and Worsted	1907	.140	.015
	1913	.154	.016
All Industries	1907	.174	.047
	1913	.186	.056

[1] Data from which these charts were prepared are in Table 3, p. 83.

averages give an idea of the value of such averages. Table 4 compares the average wages and the standard deviations for the two years. It will be seen that, with these two statistical units known, a comparison becomes quite significant even though no actual wage rates are considered.[1]

The important question here, however, is whether such an average remains significant if applied to a group of industries. In order to answer that question data have been compiled concerning the wage rates per hour for all the unskilled labor for which comparable information could be obtained in the two years that have just been considered. Table 3 and Chart 10 show the results of such a compilation. It should be recalled here that the data which are used are being considered as a sample of all wage rates for unskilled labor. A fallacy that will shortly be referred to underlies this assumption. It is impossible, however, to present the data in a more accurate form and indeed, for the present purpose of illustrating the significance of an average, it is unnecessary. It will be seen from the chart that, while the average (i. e., mean) rate of wage per hour is 17.4 cents for 1907 and 18.6 cents for 1913, the distribution around the averages is approximately the same. The distributions are represented by moderately asymmetrical forms of curves. It seems entirely accurate to state that, if it were not for uncertainty above the 20 cents per hour group due to the irregular classes of the original data, the curves would be of almost exactly the same character. If this be true, then the average rate

[1] Little use has been made of the standard deviation in previous wage studies. In the *Political Science Quarterly* of March, 1907 (pp. 61-70), Henry L. Moore advocated and illustrated its use. The author had attempted such use before finding that article, but his attempt could probably be traced back, as can most of his appreciation of the importance of statistical measures, to conversation or class-room work with Professor Moore. *Cf.*, Bowley, A. L. in *Bulletin de l'Institut International de Statistique*, vol. xviii, pp. 552-553 (1910).

TABLE 3

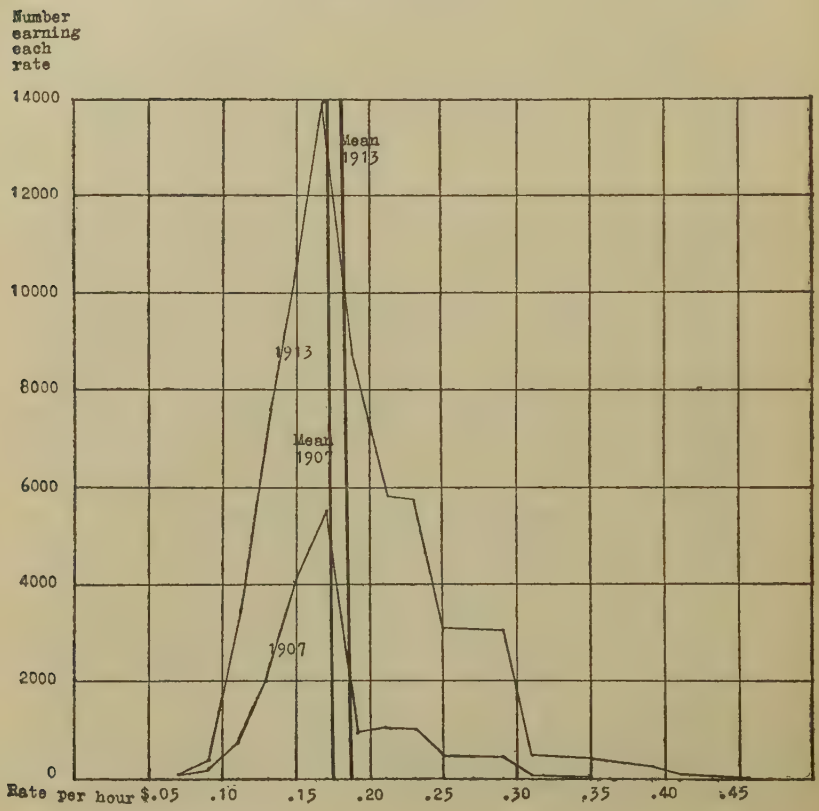
EARNINGS PER HOUR, 1907 AND 1913, SELECTED INDUSTRIES

Industry	Year	Rate of earnings per hour in cents										
		8 to 10	10 to 12	12 to 14	14 to 16	16 to 18	18 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 to 50
Blast Furnace.....	1907	..	156	534	684	1000	218	251	24	..	..	..
	1913	..	113	335	577	623	1387	1508	62	4	4	..
Woolen and Worsted..	1907	14	28	193	276	19	1	..	..	..	..	..
	1913	3	22	168	866	358	56	12	..	..	..	..
Lumber Manufacturing	1907	77	163	392	440	948	378	1478	214	4	3	..
	1913	199	2590	4808	5043	5028	2545	6788	1532	135	100	17
Car Building	1907	..	36	208	990	2267	174	586	307	39	35	29
	1913	..	64	592	1472	3752	987	1837	600	215	200	99
All Industries.....	1907	266	723	1996	4012	5583	982	2623	672	112	107	68
	1913	436	3485	7555	10603	13980	8758	14484	3562	899	890	546

NOTE: In the three high groups it is often necessary to distribute the quotations arbitrarily as they are grouped in a 30 to 40 interval only. In Charts 6 to 10 the 20 to 25 and the 25 to 30 together are divided into 5 intervals. Numbers in the body of the table indicate the number of laborers working at each rate. The upper and lower groups are slightly increased by assigning to them the few laborers in groups above and below the rates recorded in the table.

CHART 10

EARNINGS PER HOUR OF UNSKILLED LABOR IN TEN INDUSTRIES
1907 AND 1913



is of great significance. A change in that average is an indication that a real change is taking place in the whole distribution, and not an indication of increased wage rates for some in the upper or lower groups and stationary wages for all the others.

Unfortunately it is impossible from the data that exist to make comparisons which will show a similar validity for the average weekly earnings figures. It is believed that such

validity exists and that the fact of its existence for the hourly wage rate is a strong indication of its existence for the more significant average.

While it would be desirable definitely to prove the significance of the average weekly wage rate by something more than implication, it is not necessary for the use to which the average is here to be put. If it were to be used as an absolute figure in the greater part of the study, then the whole justification for its use would rest on the fact that it accurately represents the exact state of the great body of unskilled laborers. Interest here is directed mainly toward change. The variations in wages from year to year are to be compared with other changes that are taking place in economic phenomena. This being true, it is not necessary to consider whether the average accurately represents the definite economic condition of a large group at any particular time. It must be shown, however, that the average does in its changes represent a general alteration in the condition of the wages of workers to which it applies. The figures and the frequency polygons demonstrate the fact that an average wage per hour is representative. To show that the average hours per week figure is representative would give further ground for the assertion that the average weekly wage has the limited significance that has been and will be assigned to it. The classification used by the Bureau of Labor Statistics for hours of labor, indeed the fact that the hours themselves fall at certain well defined intervals, 48, 54, 60, etc., makes a statistical proof similar to the one used in the case of the hourly wage rates impossible.

It will be useful here to refer back to the theory of sampling. If it be assumed that the sample is secured in an unbiased manner, the validity of the mean may be tested by the formula, $\sigma_m = \frac{\sigma}{\sqrt{n}}$.[1] As applied to the all industries

[1] Yule, G. Udny, *Theory of Statistics*, p. 344 *et seq.*

compilations this gives a value for σ_m in 1907 equal to 0.036 cents, and in 1913 equal to 0.021 cents. That is, if n samples be taken, 99% of the accidental variations of the means of those samples would lie within about 0.1 cent above or below the average of 17.4 cents for 1907, and about 0.063 cents above or below the average, 18.6 cents for 1913.[1] So long as it be assumed that the conditions of simple sampling have been conformed to, this computation makes possible a statement that the averages that have been computed are significant. It must be admitted here, as elsewhere, that, even with the assumption, only one part of the weekly average earnings figure is definitely shown to be significant, but if the average rate per hour is significant, then an average weekly rate based upon that average hourly rate must partake of certain of its characteristics. It will be assumed, then, that the average wage as here computed is of some significance, although its limitations and qualifications that must apply to its use should always be kept in mind.[2]

Many of these limitations cease to apply when an index of average wages is considered rather than the average rate itself. If interest is centered in the variation of wages, as it is to be in most of what follows, then a consideration of the

[1] It should, of course, be noted that owing to the poor selection of data that must be used no such accuracy is claimed for the actual results of this study.

[2] "For certain purposes averages and indexes may be absolutely useless. An average or an index number cannot be used when the exact wage conditions of an industry or locality must be ascertained. But for the study of broad tendencies, an average still represents a very convenient method, and when the tendency studied applies to many industries and many localities, nothing can supplant an index number. In any case, it cannot be held consistently that averages and index numbers are applicable to the study of prices and not applicable to the study of wages and hours of labor." I. M. Rubinow, "The Recent Trend of Real Wages," *American Economic Review*, vol. iv, p. 807.

changes from year to year in an average computed annually on the same basis is of profound significance. If there can be computed an average which, as has been set forth, does to a limited degree portray an actual condition, then we may compute that average from year to year, and in its variations we may find a much more accurate picture of the changes in the conditions of the class of labor covered than is depicted of the actual dollars and cents condition of any individuals or of groups in any locality in any particular year. Caution is necessary here, as elsewhere. An increase in the average may mean, it usually does in the cases referred to here, that the general trend of our class of labor is turning upwards. It may, however, mean that wages in a single industry have immensely increased, and that those of others have remained stationary, or even declined. An average wage of labor in general, i. e., applying to all industries and to all occupations, is subject to this criticism and must be used with a large amount of skepticism. It has been demonstrated that this difficulty, while present to some extent, is of much less importance when a single type of labor is being considered.

METHODS OF COMPUTING AN INDEX OF UNSKILLED WAGES

Some of the difficulties in computing an index of unskilled wages from the data that have been described arise from the necessity of weighting the various wage figures before combining them into an average figure. It has been suggested that weighting makes no material difference.[1] Demonstration of that fact by the method to which reference is often made proves nothing more than that in the particular case the various methods of weighting gave results that were fairly close to each other. The only index that could with any degree of accuracy be termed an unweighted one would

[1] *Nineteenth Annual Report of the Commissioner of Labor*, pp. 22-24.

be an index in which every wage earner of the class considered was represented by his individual wage rate. Each would be given the weight of one. This is an ideal toward which any average that may be computed should aim, and it gives a suggestion of a method of weighting which theoretically would be excellent.

Wage averages of several industries have been computed. The problem is to combine these averages in such a way as to make them truly depict the general situation. A hasty solution of the difficulty might be to give to each industry a weight relative to the importance of that industry in the whole scheme of American industry. It must, however, be remembered that the average computed is not representative of the industry in general, but only of the unskilled labor in it. An ideal weighting method would then involve the computation of the total number of unskilled in each of the industries represented and the assignment to each industrial average of its appropriate weight. An average resulting from such weighting would be accurate for the industries represented, but not, of course, for unskilled labor in the industries of the country as a whole unless they were all represented. While figures of the numbers engaged in the important industries of the country at different periods are made readily available by the Bureau of Census, no division is made between the skilled and the unskilled groups. The assumption that the unskilled occupy the same relative position so far as numbers are concerned in each industry is clearly fallacious, although a scheme of weighting based on the importance of the industry will somewhat refine the crude average that will be found by giving each industry equal weight or by giving each wage quotation equal weight.

It is possible to point out an ideal system of weighting. It is not, however, possible to apply it. Table E [1] shows the

[1] This table will be found in the appendix.

attempt that has been made to use the general principle on which it is based. For the census years 1889, 1899, 1904, 1909, 1914, and 1919 the numbers engaged in each of the various industries have been listed. An estimate has been made of the proportion of unskilled in each of the industries. This is applied to the total in the industry and the weight to be given its average wage rate has been based on the resulting figure. In order to make changes in weights less abrupt an intermediate figure has been interpolated and will be used for the year midway between census years. Possible errors made in estimating the proportion of unskilled in any industry will have little effect on the accuracy of the index, so long as they are not definitely biased and do have some relationship to actual conditions.[1]

Two results of this weighting process appear in Table 5. The second, an average yearly wage, is simply a general vague attempt to arrive at a money figure for unskilled wages in each of the years under consideration. Its limitations have been repeatedly mentioned. The first figure is far more significant. It is an index of unskilled wages computed on the basis of the weights that have been described. The particular method of derivation calls for a rather detailed description.

In selecting a method of combining the data with a fair degree of accuracy it is necessary to keep two facts clearly in mind. In the first place the data are not continuous. That is, it is not possible to start with 1890 and present data extending through 1924 that will include in each year figures from similar industries. At periods to be noted later sharp changes occur in the industries represented and in the sources from which information is derived. The first problem then

[1] For a discussion of the effects of bias as contrasted with blind chance in choice of weights see Irving Fisher, *The Making of Index Numbers*, pp. 439-450.

is one of fitting together unrelated series of data. In each year where a change of data occurs two wage figures have been computed, one from data which appear in those presented for the preceding year and the other from those which are carried on into the following year. For example, it might be assumed that figures covering twenty industries in 1900 give an average wage of $10.00. In 1902 there might be figures from only fifteen of the industries and the average might be $12.00. It would obviously be wholly inaccurate to show an increase of 20 per cent for the period from 1900 to 1902. If the data for 1901 make it possible to compute for that year an average for both the twenty and the fifteen industries, then by this means an approximation of the change may be computed. If for the twenty industries the 1901 average is $10.50 and for the fifteen industries, $11.25, an increase from 1900 to 1901 of 5 per cent and one from 1901 to 1902 of 6.7 per cent are indicated. Then using the year 1900 as a base represented by 100, index numbers for 1901 of 105 and for 1902 of 112 can be computed by the chain relative method.[1] Specific instances where this method needs to be used will be referred to later in this chapter.

The second problem is the choice of an index number which will be fairly accurate and which will permit the use of the weights that have been described. The particular difficulty here arises from the fact that weights are not changed yearly but at intervals of from three to five years. That is, the same weights are used from 1890 to 1892. From 1893 to 1897 a new series is used based upon the changed census figures, computed as has been described. If these data were presented by simply multiplying the wage rates by the weights and dividing through by the total

[1] 100 x 1.05 for the 1901 figure and 100 x 1.05 x 1.067 for the 1902 figure.

weights,[1] the difference appearing from 1892 to 1893 might be influenced more by the change in weights than by the wage changes. While the alterations in the number employed indicated by the changing weights are important, they would be given undue and irregular importance if this method were used. A method which avoids this difficulty makes use of the weighted aggregative using constant weights for the years 1890 to 1893.[2] An 1893 index number is then computed from the base year (assumed here to be 1890) making use of the arithmetically cross weight aggregative method which takes into account both series of weights.[3] The two 1893 index numbers are then compared, and if the second differs from the first, that difference is evenly distributed over the intervening years. For the sake of simplification in explanation it has been assumed that the base to be used is 1890. The same general method has been followed for the base year used throughout the study, 1913. Index numbers have been computed in each direction from that year. In a few cases it has not been possible to carry the cross weight aggregative computation back to the first year of the old weighting series because of a change in the data that must be used. Under such circumstances an attempt is made to conform as closely as possible to the method described and to make small adjustments where necessary.

[1] This may be represented by the formula $\frac{\Sigma\, l_1\, w_1}{\Sigma\, l_0\, w_0} \div \frac{\Sigma\, l_1}{\Sigma\, l_0}$ where l_1 and w_1 represent the number of a specified group of unskilled and their wage rate at time 1 and l_0 and w_0 their rate at time 0. Much of the material in the pages that follow has been suggested or verified by *The Making of Index Numbers* by Irving Fisher.

[2] Represented by the formula $\frac{\Sigma\, l_0\, w_1}{\Sigma\, l_0\, w_0}$, Fisher, *op. cit.*, pp. 371, 471.

[3] Represented by the formula $\frac{\Sigma\, \frac{l_0 + l_1}{2}\, w_1}{\Sigma\, \frac{l_0 + l_1}{2}\, w_0}$, Fisher, *op. cit.*, p. 484.

In no case is the alteration of any consequence for a single year, although the cumulative effect on the series, if not allowed for, might become important.

This discussion of the formation of an index has so far only mentioned the fact that comparable data do not exist for the whole period under consideration. It will be necessary to show the gaps in the data which have been bridged and inconsistencies which still appear irremovable. It will be recalled that the data from 1890 to 1903 are continuous for the industries from which data are derived. The question of the accuracy of the index up to that date is based entirely on the accuracy of the original data and on their comprehensiveness as a sample of industrial conditions in general. This particular subject has been considered at length in Chapter II. In 1903 comes the first break in the information. Certain industries are discontinued and there is a large increase in the samples presented for certain of the others. This particular break presents few difficulties. The differences in money wages computed by various methods amount to little, 2.2 per cent in the case of the weighted index,[1] 1.9 per cent for the simple occupational averages, and 0.5 per cent for the simple quotation averages.[2] These differences are so small, considering the lack of absolute accuracy that must characterize the study, that they might be disregarded. As the chain relative method of joining two disconnected series will be used in later cases where differences are greater, it will be here, although it only adds slightly to the accuracy.[3]

[1] The index computed by the arithmetically cross weight aggregative method will for convenience be referred to as the weighted index.

[2] For the earlier years averages have been computed giving each occupation the weight of one, and giving each wage quotation the weight of one.

[3] The chain relative method is described on p. 89 *et seq.*, *supra.*

The second break in the data comes, as Chapter II has pointed out, in 1907. There the change is much more radical than that of 1903. It will be recalled that in 1907 the figures for twenty industries stopped, and the more intensive studies began. For 1908 and 1909 only eleven industries are represented. In 1910 there is a greatly increased representation in the steel industry survey, and in 1911 cotton finishing is added to the list of industries represented. In 1914 the lumber, millwork, and car-building series are missing, and after that year there is a great irregularity in all the series. The only year for which representation is in any way complete is 1919, and in that year the data are composed of figures for actual earnings instead of full-time earnings. Years for which data are missing in the various series are indicated by blanks in Table C.[1]

In 1907 a comparison of money averages of wages computed by the methods used shows a difference for the weighted averages of 0.4 per cent, for the simple occupational averages 16.2 per cent, and for the simple quotation averages 3.2 per cent. Here again the chain relative method is used to compute the index. This method is unnecessary in computing the changes from 1908 to 1909 and from 1909 to 1910 as the data cover the same industries.[2] The 1910 figure for comparison with 1909 is based on the same industries that are recorded in 1909. The 1910 figure for comparison with 1911 includes the extensive data of the steel industry which become available in 1910 for the first time. Throughout the study whenever a change in the source of

[1] Table C appears in the appendix.

[2] It should be noted that another refinement by the chain relative method is possible for some of the data. Figures for identical establishments for each series of two years might be compared. This is, however, possible for only part of the data and so has not been attempted. As has been explained earlier, use is made in every case of the quotation which covers the greatest number of cases.

data is made this particular sort of adjustment has been used. Only one other instance of it is of sufficient importance to merit detailed description.

It has been pointed out in the earlier chapters that the data collected by the Bureau of Labor Statistics in recent years are inadequate so far as the present study is concerned. From 1913 to 1915 the data are only barely satisfactory.[1] The material that the Bureau furnishes in a form usable in the computation of a yearly index after the year 1915 is inadequate. Data from some other source must be used if the index is to be carried through in any sort of a reliable form. Scattered figures for various industries may be secured for the years since 1915 from many sources.[2] These figures are generally comparable in only one respect, they make no attempt at carrying a comprehensive survey through the period of years for which information is urgently needed. In only a single case, that of the wage surveys of the National Industrial Conference Board, are data which are both adequate and usable presented.[3] Unfortunately for the present purpose the Board has presented details of wages only for the years 1914, 1920, and those since 1920. The data published divide wage earners into two groups, skilled and unskilled. No detailed description of the occupations included in the latter group or of the criteria used to differentiate the groups has been published. The general distinctions which are drawn have been referred to earlier.[4] The industries included cover a wide range of American manufacturing and

[1] This criticism applies to the number of industries for which data are available, and not to the data themselves.

[2] These include particularly trade journals in many industries. A few additional sources are referred to later in the chapter.

[3] National Industrial Conference Board, *Research Studies Nos. 20, 31, 35, 45, 52, 59* and *62*.

[4] *Supra*, p. 14.

seem to be an adequate sample.[1] The data used are found in Table D. In order to secure a yearly wage it has been necessary to average monthly or quarterly figures presented by the Board. Because of a slight irregularity in the Board's collection of figures the yearly averages are not strictly analogous. They do represent more accurately the yearly rates than any single monthly figure would. Notice should also be taken of the fact that the figures as published are actual earnings, not full-time earnings. As all comparisons in which these figures are used are made with years in which figures from the same source are utilized, this fact has little influence on the trend of the index.

The computation by the Board of an index of unskilled labor in all industries has been on the basis of giving to each wage quotation equal weight. Partly in order to have all computations in this study made on the same basis and partly because the method of weighting that has been described earlier is believed to be somewhat more accurate, the average wage figures of the industries have been recomputed on the basis of the weights appearing in Table E. A series of indexes of the Board figures combined on this basis with 1914 for the base year have been computed by the arithmetically crossed weight aggregative method. This series is used for the years from 1920 to 1924 in the completed index. It is joined to the Bureau of Labor Statistics figures by means of chain relatives based on 1914. It should be noted that the figures presented for the years 1914 to 1919, inclusive, are based on the Bureau's figures only, the 1914 Board figure being used simply as a connecting link. This means that there is no relationship between the 1919 index and the 1920 index except through the 1914 figure. It has

[1] In 1924 the Board collected figures from 1764 plants employing 743,227 wage earners and representing 23 industries. *Wages and Hours in American Industry*, National Industrial Conference Board, 1925, p. 20.

been pointed out earlier that the 1916, 1917, 1918, and 1919 indexes are based on inadequate information and are presented with no pretension of accuracy. The computed 1919 figure is especially weak and it seems wiser for that year to use one found by simple interpolation between those of 1918 and 1920.

AN INDEX OF UNSKILLED WAGES

Table 5 contains the results of the computations that have been described. The captions of the columns taken together with the preceding sections of the chapter should make clear the material that is presented. Column I, the weighted index, contains the results which are considered to be of the most value. Column II contains a weighted average wage which is of value only from 1890 to 1913 and from 1920 to 1924. Even within these periods it must be used subject to the qualifications that have been explained. The range of industries for which data may be secured from 1914 to 1920 is too small to make the averages for these years worthy of attention. An index based on them is not, however, wholly without significance. The data of the remaining columns are presented with the purpose of showing the effects of various weighting methods rather than of showing facts concerning wage variation. Column III contains an index based on the simple occupational average and Column IV, the money averages from which Column III has been computed. Column V contains an index based on the simple quotation average and Column VI, the money averages from which the preceding column was computed.

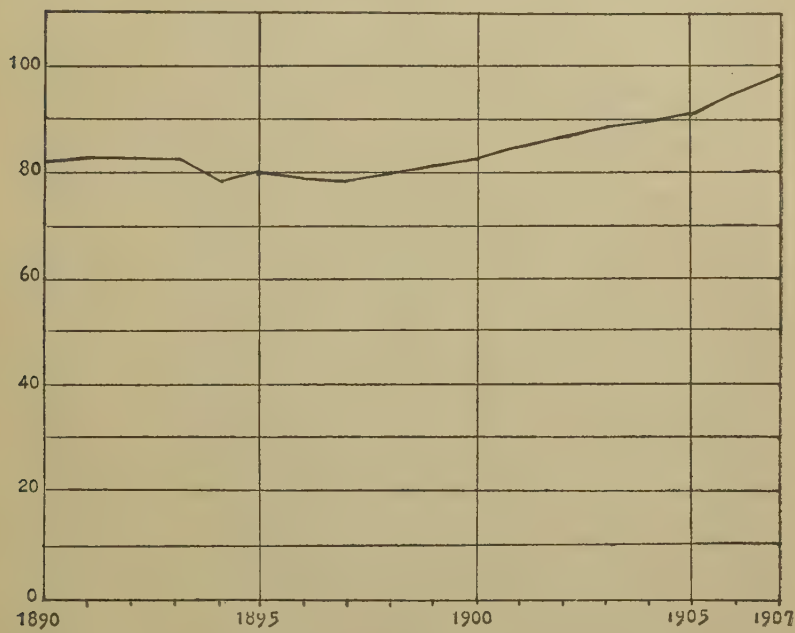
Charts 11 and 12 portray the general course of unskilled wages in the American manufacturing industries from 1890 to 1913 and from 1913 to 1924, respectively. It will be observed that there was a slight downward tendency during the early years of the first period with low points in 1894 and

1897. From the latter year there was a continually rising trend through 1907. A decided drop was in evidence in 1908 with some recovery in the two following years and a decline in 1911 almost to the 1908 level. A rapid recovery

CHART 11

RELATIVE FLUCTUATIONS IN THE MONEY WAGES OF UNSKILLED LABOR IN MANUFACTURING, 1890-1907

1913 = 100

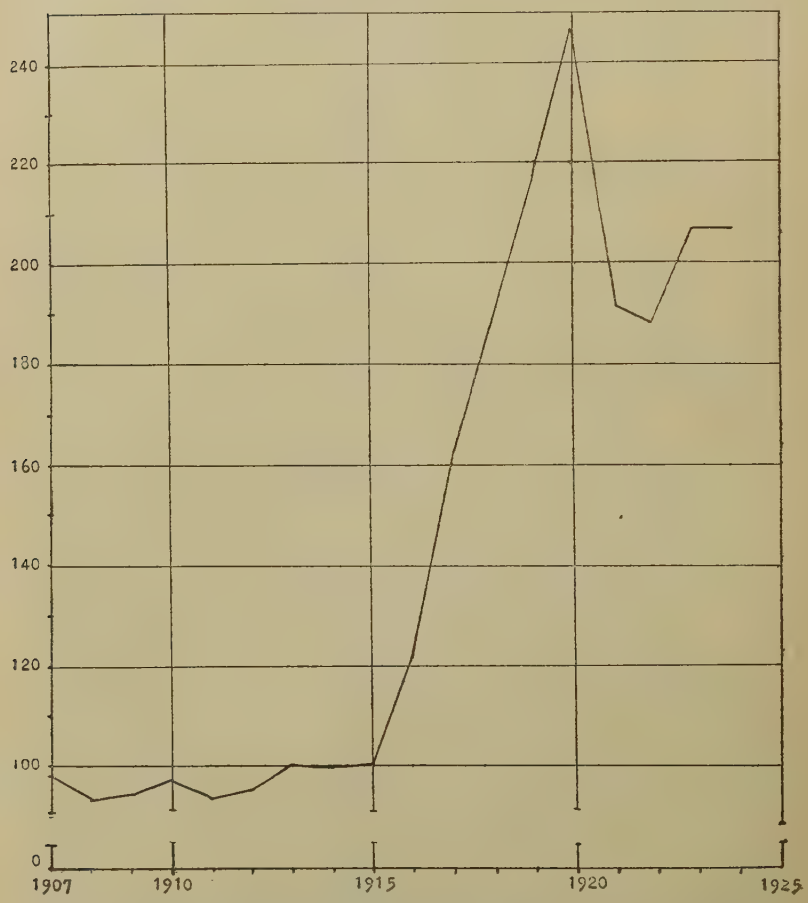


in 1912 and 1913 carried unskilled wages to a level over 2% above the previous high point reached in 1907. The next three years brought little change in the general level. By 1916, however, the war increases in wages began to make themselves apparent and the index shows large increases until the peak was reached in 1920 with an average of unskilled wages almost 150% above the 1913 level. A decline

CHART 12

RELATIVE FLUCTUATIONS IN THE MONEY WAGES OF UNSKILLED LABOR IN MANUFACTURING, 1907-1924

1913 = 100



of about 25% appeared in the 1921 figure followed by a slight decrease in the next year. In 1923 a marked increase appeared and the average again reached a point over 100% above its 1913 level. There was practically no change from 1923 to 1924.

TABLE 5

WAGES OF UNSKILLED LABOR IN THE MANUFACTURING INDUSTRIES OF THE UNITED STATES, 1890–1924

Year	I Weighted Index 1913 = 100	II Weighted Average Wage	III Index of simple occupational average 1907 = 98	IV Simple occupational average wage	V Index of simple quotation average wage 1913 = 100	VI Simple quotation average wage
1890...	81.9	$8.71	83.6	$8.60	83.5	$9.27
1891...	82.1	8.74	84.3	8.68	83.7	9.29
1892...	82.1	8.75	84.2	8.66	83.5	9.26
1893...	81.8	8.73	84.2	8.67	83.8	9.30
1894...	78.1	8.34	81.8	8.42	83.5	9.27
1895...	79.9	8.45	82.4	8.58	85.7	9.51
1896...	79.0	8.46	82.9	8.64	82.6	9.17
1897...	78.4	8.40	82.9	8.64	82.6	9.17
1898...	79.5	8.53	83.5	8.70	83.1	9.22
1899...	81.1	8.70	84.2	8.77	84.3	9.36
1900...	82.2	8.83	85.1	8.86	84.6	9.39
1901...	84.3	9.05	87.2	9.08	85.8	9.52
1902...	86.2	9.25	88.7	9.23	87.1	9.66
1903...	88.8	9.64	91.3	9.63	88.7	9.86
1904...	89.6	9.84	91.4	9.64	89.6	9.94
1905...	90.4	9.91	91.9	9.70	89.6	9.95
1906...	94.3	10.34	94.7	10.00	93.2	10.34
1907...	98.0	10.76	98.0	10.35	96.6	10.73
1908...	93.0	10.22	....	....	92.9	10.32
1909...	94.2	10.37	....	....	96.8	10.75
1910...	96.7	10.65	....	....	99.0	10.99
1911...	93.5	10.13	....	....	94.0	10.44
1912...	95.3	10.32	....	....	96.9	10.76
1913...	100.0	10.84	....	....	100.0	11.10
1914...	99.8	10.78	....	....	98.2	10.90
1915...	100.2	10.65	....	....	95.0	10.54
1916...	121.8	13 78				
1917...	150.5	17.18				
1918...	187.7	21.69				
1919...	217.1	23.83				
1920...	246.5	25.98				
1921...	190.8	20.11				
1922...	187.9	19.81				
1923...	206.3	21.76				
1924...	206.5	21.79				

LIBRARY
SCHOOL OF BUSINESS

NOTE—Figures for years left blank are of no significance because of the lack of adequate data. Columns 1 and 3 are not computed from 2 and 4 respectively, and so are not exactly comparable. The link relative method takes into account changes that cannot be shown in columns 2 and 4. The indexes of columns 1, 3 and 5 have been computed to one decimal place for purposes of comparison, not because such accuracy is justified by the data.

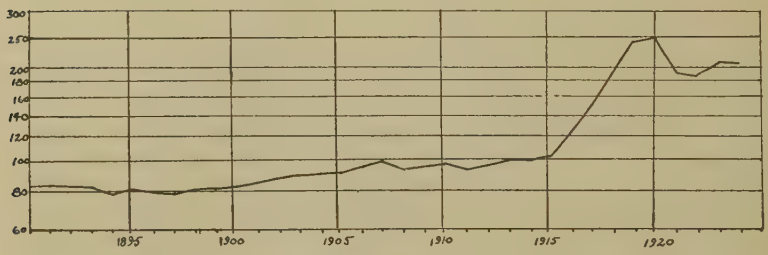
Chart 13 describes the wage changes that have just been referred to by means of a logarithmic scale.[1] The advantages of depicting changes by this method lie in the fact that the whole period may be covered by a single chart on a fairly large scale and, more important, that it shows the proportional changes far more accurately than the arithmetic-scaled chart can. Equal vertical distances on any part of a chart on a logarithmetic scale will indicate equal percentages of in-

CHART 13

RELATIVE FLUCTUATIONS IN THE MONEY WAGES OF UNSKILLED LABOR IN MANUFACTURING, 1890-1924

(SEMI-LOGARITHMIC SCALE)

1913 = 100



crease or decrease. On the arithmetic charts equal vertical distances simply show increases that are equal in absolute amount. In a study where primary attention is to be paid to the relative increase or decrease of an economic phenomenon at various periods the logarithmic presentation has the great advantage of clarity. Increases of equal importance appear in their true perspective and are not unduly influenced by the particular level from which they start. It is of interest to notice that the line which describes the increase in wages from 1915 to 1919 is almost straight. On a loga-

[1] *Cf.*, Irving Fisher, "The Ratio Chart" in *Quarterly Publications of the American Statistical Association*, vol. xv, pp. 577-601 (June, 1917).

rithmic chart a straight line connecting the amounts of three or more successive years indicates a constant rate of increase. Our data would then indicate that during each of the years when the war influences were most important there was an approximately equal upward trend of wages. The first year of the period as might be expected shows a somewhat smaller percent of increase than the last three.

The analysis thus far may at first thought be criticised as doing nothing more than show some facts concerning wages that are apparent to every one. The general upward trend of wages from 1897 to 1913, the rapid rise during the war years, the decline from 1920 to 1922, and the recovery the following years are not new facts. The quantitative measurement of them on the basis of the data here used does, however, tend to make the general movement a more definite and specific thing. The investigation will be carried further and an attempt will be made to discover the change that has taken place in real unskilled wages and to connect this change with certain other economic phenomena that are related to it. The following chapter will be concerned with such an analysis.

Before making further use of the index that has been computed it will be compared with certain other data of unskilled wages. Four distinct sorts of data will be presented. Two of them are wage series covering practically the same period as the index and relating to transportation workers and farm laborers. The third is the average basic wage paid by the United States Steel Corporation in the Pittsburgh district. The fourth is the wages of common labor figure compiled since 1915 by the Bureau of Public Roads of the Department of Agriculture. The chief interest in such figures is, from the point of view of the present study, in an examination of their variations from the results of the index that has been compiled in this chapter. It

should be understood that close correspondence is not to be expected. The large differences between the groups and in employment conditions prevailing in them put that beyond the bounds of probability. The groups covered by the figures explain that. Farm labor, for example, receives in general a far different wage from factory labor. There are, however, certain factors that should cause a somewhat similar tendency in the wages of each class. The unskilled laborer is not on the whole an intelligent competitor in selling what he has to offer. He has little advice or help in finding the best market for his labor, but in time he does discover that other laborers elsewhere are receiving more pay. Once he does secure information of this sort it is in general more easy for him to take advantage of it than for the more skilled worker who is more likely to have home and family influences to keep him in a single place. To counteract this last are the superior facilities of most skilled groups in learning of wages paid elsewhere and their power of compelling employers to keep wages on a somewhat equalized basis. For the unskilled groups, however, no close general correspondence is to be expected, although the general tendencies should be similar under similar conditions.

Several different wage figures for farm laborers are reported by the Department of Agriculture. These include monthly and daily wage figures with and without board. The daily figures are recorded at harvest periods and at other times. The data which will be presented here are composed of the monthly wage figures without board and relatives computed from that wage. While the other wage figures differ greatly from those reported on this basis, relatives computed from them show little difference. The table contains figures for the years since 1890 when a report has been made.

TABLE 6

MONTHLY WAGES OF FARM LABOR (WITHOUT BOARD)

Year	Money Wages[1]	Relative Wages 1913=100	Year	Money Wages	Relative Wages 1913=100
1890	$19.45	64	1913	$30.31	100
1892	20.02	66	1914	29.88	99
1893	19.97	66	1915	30.15	99
1894	18.57	61	1916	32.83	108
1895	18.74	62	1917	40.43	133
1898	19.16	63	1918	48.83	161
1899	19.97	66	1919	56.29	186
1902	22.14	73	1920	64.95	211
1906	26.19	86	1921	43.32	143
1910	27.50	91	1922	41.79	138
1911	28.77	95	1923	46.91	155
1912	29.58	98	1924	47.53	157

The statistical accuracy of these figures doubtless leaves much to be desired. They are computed from reports made by the crop reporters to the Department of Agriculture. They come from all sections of the United States and are combined into a rough sort of average for the country as a whole. The method of their computation does not seem to have varied in recent years at least and so, while the money figures have little meaning, the relatives do probably express the trend of such wages with fair accuracy. Two facts of especial significance are revealed in the relative figures that have been computed.[2] The level of farm wages in 1890 as compared with 1913 was distinctly lower than that of unskilled wages in manufacturing compared on the same basis. In other words the money wages of farm laborers rose to a greater degree from 1890 to 1913 than did the wages of urban unskilled workers. The drift toward the cities combined with the large volume of immigrants, most of whom

[1] *Yearbook of the Department of Agriculture*, 1924, p. 1116. (1924 figure from *Survey of Current Business*, Aug., 1925, p. 101.)

[2] Chart 14 shows these figures graphically.

settled in urban centers, undoubtedly did much to bring about this change. The second fact of importance concerns the difference between agricultural and manufacturing unskilled wages during the war period and since. In agriculture wages did not rise as high during the war period as they did in manufacturing, and their decline in the post-war period was far more abrupt. Whereas in 1924 money wages of unskilled laborers in the manufacturing industries were 106 per cent above the 1913 level, in agriculture such wages were only 57 per cent above their 1913 level. Apparently the farm owner has not been the only one to suffer from the depression in agriculture.

The figures of wages of unskilled railroad workers that can be presented for comparison with those of unskilled factory workers are unsatisfactory from the point of view of statistical principles and from that of continuity. An average daily wage figure was computed by the Interstate Commerce Commission for various types of railroad labor from 1892 to 1914.[1] It was derived by dividing the total yearly compensation of any particular class of employees by the total number of days worked by the members of that class. A purely artificial figure of this type is significant only so far as it indicates changes and so only the relative figure will be considered here. Since 1914 there have been changes in the method used by the Commission in reporting wages. From 1915 through 1921 an average hourly wage was reported for various classes of labor, and since 1922 an average annual-earnings figure has appeared.[2] It is thus impossible to present a relative figure which represents the same data through the whole period. An attempt to con-

[1] Reported in *Statistics of Railways in the United States*, Interstate Commerce Commission.

[2] Reported in the *Annual Reports* of the Interstate Commerce Commission.

tinue the figure through 1921 will be made by using the results of an investigation of the National Industrial Conference Board[1] which presented figures for unskilled railroad labor wages from 1914 through 1921. A slightly different group from that covered by the Interstate Commerce Commission reports is represented and the time of year at which figures are taken is different. In spite of this the variation in the average-earnings figures presented by the two reports is small and almost constant. By the use of the Board's figures from 1915 on the index is carried through 1921. Weekly earnings for the period after 1915 are compared with daily earnings of the earlier period. This would involve little inaccuracy if the figures for the two periods had been derived by similar methods. In order to carry the figures reported by the Interstate Commerce Commission through the whole period under discussion, a second computation has been made. It is found that in the Board's investigation the difference between the July, 1914 and the July, 1915 figures was 1.8 per cent. A difference equal to that amount will be assumed to exist between the 1914 and the 1915 Interstate Commerce Commission figures. It should be recalled that the figures used after 1914 represent hourly wage rates while the earlier ones are derived from the daily wage rates. There seems to be no way with the data available of removing this difficulty. It should be understood that the reduction of hours after 1914 makes the index which is based wholly on the Interstate Commerce Commission data of little real value. Index numbers to which the criticism applies are printed in parentheses in Table 7 which contains the indexes computed from the railroad data that have been described.

[1] National Industrial Conference Board, *Research Report, No. 46.*

TABLE 7

RELATIVE WAGES OF UNSKILLED RAILROAD WORKERS [1]
1913 = 100

Year	Wage index	Year	Wage index	Year	Wage index
1892....	77	1902....	79	1912....	95
1893....	77	1903....	83	1913....	100
1894....	75	1904....	84	1914....	101
1895....	74	1905....	84	1915....	104 (103)
1896....	74	1906....	86	1916....	111 (106)
1897....	73	1907....	92	1917....	130 (132)
1898....	73	1908....	92	1918....	189 (198)
1899....	75	1909....	87	1919....	203 (263)
1900....	77	1910....	93	1920....	273 (316)
1901....	78	1911....	95	1921....	212 (317)

It will be noticed that the direction of these indications of the trend of railroad wages corresponds closely to that of the manufacturing index. The railroad figures start in 1892 at a somewhat lower level than do the manufacturing wages, and decline in the same general fashion that those wages follow. Each series reaches its low point in 1897. From that year each index shows a general advance until 1907. Manufacturing wages underwent a sharp decline in 1908. This was reflected in the railroad wages for 1909 which cover the latter half of the year 1908 as well as the first half of 1909. Railroad wages had no 1911 decline, but failed to rise from 1911 to 1912. The war increases in the two indexes were irregular, railroad wages rising in 1920 to a relative level over 10 per cent above that of manufacturing wages. Each series declined about 22 per cent in 1921.

The next series to be presented consists of an index of hourly basic wage rates of unskilled labor employed by the United States Steel Corporation in the Pittsburgh district.

[1] Computed from figures referred to in the preceding pages. Through 1915 data are for the years ending June 30th; thereafter they are for the calendar year.

It should be particularly noted that this index does not take into consideration changes in the hours of work. It is computed from the rate paid per hour only.

TABLE 8

RELATIVE WAGES OF LABORERS EMPLOYED BY THE UNITED STATES STEEL CORPORATION.[1] 1913 = 100

Year	Wage Index	Year	Wage Index	Year	Wage Index
1900	75.8	1908.....	83.3	1917.....	165.0
1901	75.8	1909.....	83.3	1918.....	201.8
1902	78.7	1910.....	86.7	1919.....	248.0
1903	80.8	1911.....	88.4	1920.....	268.9
1904	73.2	1912.....	88.4	1921.....	211.7
1905	77.0	1913.....	100.0	1922.....	161.6
1906	78.3	1914.....	101.0	1923.....	196.1
1907	83.3	1915.....	101.0	1924.....	202.0
		1916.....	120.9		

Until 1913 this index is below the index of general manufacturing wages. In other words, up to 1913 the wages of unskilled labor employed by the United States Steel Corporation,—assuming their wage changes are accurately indicated by the change in the hourly rate,—increased by a greater relative amount than did wages in industry in general. This seeming increase is perhaps to be balanced by the small decrease that came during these years in the hours of labor.[2] When the wage level for 1924 is considered it

[1] Index computed from wage rates quoted in *Labor Policy of the United States Steel Corporation*, Charles A. Gulick, p. 58. 1923 and 1924 figures from the *Survey of Current Business*, February, 1925, no. 42, p. 119. As the data can be accurately found, the indexes are computed to one decimal place.

[2] The average hours of labor for the iron and steel industry as a whole (not for the United States Steel Corporation only) show a decrease from 1907 to 1913 for laborers in the blast-furnace branch amounting to 5 per cent, in the bessemer converter branch 4 per cent, and in bar mills 8 per cent. *Bulletin 381*, pp. 22, 38 and 121.

should be recalled that the hours of labor in the industry were reduced to a marked degree in 1923 and 1924. The decrease for the industry as a whole from the 1913 level of hours varied from about 22 per cent in the bessemer converters, open hearth furnaces, and blooming mills, 18 per cent in plate mills, and 14 per cent in blast furnaces to no decrease in puddling mills and sheet mills.[1] A general decrease of at least 15 per cent seems to be a fair estimate. This should be taken into consideration in comparing the wage figures for steel workers with those for manufacturing in general. The condition of the unskilled laborer in the United States Steel Corporation at the close of the period under discussion seems to have declined relative to that of the unskilled worker in general manufacturing. The fact that in the early part of the period the steel industry shows a high wage level for its unskilled workers indicates that an equalizing process has taken place. This does not indicate that unskilled workers in the Steel Corporation are being paid less than unskilled workers in general. The data which are being compared here are relative, not absolute. Due to the fact that no general figures of the weekly hours of labor by unskilled employees of the Steel Corporation are available no statement can be made concerning absolute figures. For unskilled labor in the iron and steel industry in general the average weekly wage figure is still above the general average of all manufacturing.[2]

The figures for wages paid to laborers on roads require little explanation. They are compiled by the Bureau of Public Roads of the United States Department of Agriculture and are quoted in Table 9. The data since 1921 have been compiled directly from federal aid project reports.

[1] Figures for the industry as a whole from *Bulletin 381*, pp. 38, 52, 82, 97, 22, 67 and 138.

[2] Tables C and D in the appendix and *Bulletin 381*.

The earlier "data have included reports on farm labor or other forms of common labor closely correlated as reported to the Department of Agriculture or the Department of Labor." [1] Little statistical accuracy can be claimed for the figures, but they are worth quoting because they represent an approximation of the wages of unskilled labor in a field that must otherwise be unrepresented.

TABLE 9

WAGES OF COMMON LABORERS ON ROADS

Year	Wage rate (Cents per hr.)	Relative wage 1915=100	Year	Wage rate (Cents per hr.)	Relative wage
1915....	20	100	1920....	49	245
1916....	23	115	1921....	36	180
1917....	28	140	1922....	32	160
1918....	36	180	1923....	38	190
1919....	41	205	1924....	38	190

Attention is again called to the fact that the figures and indexes of unskilled labor that have been described in the latter part of this chapter have been presented, not because it is felt that they accurately depict the wages received by the laborers included, but because it seemed desirable to compare the general manufacturing index with descriptions of the trends of wages computed for different unskilled groups. The resulting comparison [2] indicates a remarkable degree of similarity in the general tendencies of the indexes that have been computed. No pretension is made that these additional indexes prove the accuracy of the index of manufacturing wages. The only real evidence of accuracy there is based upon the methods of computation and a consideration of the data used both from the point of view of its quality and

[1] *Survey of Current Business*, August, 1925, no. 48, p. 101.

[2] Charts 14 and 15 portray this comparison.

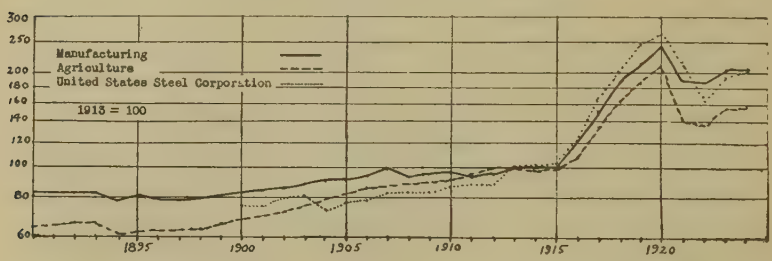
quantity.[1] It has been admitted throughout that the results cannot approach absolute accuracy and that they differ in the degree of accuracy at different periods during the years considered. It may be asserted that the tendencies that have been described are correct and that their quantitative measurement has been made with the highest degree of accuracy that the data permit.

A measurement of the money wages of any group may mean much or little. Its significance can only be determined

CHART 14

COMPARISON OF THE RELATIVE FLUCTUATIONS IN THE MONEY WAGES OF UNSKILLED LABOR IN MANUFACTURING, AGRICULTURE, AND THE UNITED STATES STEEL CORPORATION, 1890-1924

(SEMI-LOGARITHMIC SCALE)



after it has been compared with the variations in the monetary unit on which it is based. There have not been stable prices for any considerable time during the period under discussion. Four different tendencies in the movement of the value of money during the period may be discerned.[2] A wage index becomes meaningless without their consideration.

[1] Tables A–C in the appendix furnish detailed evidence on the latter subject.

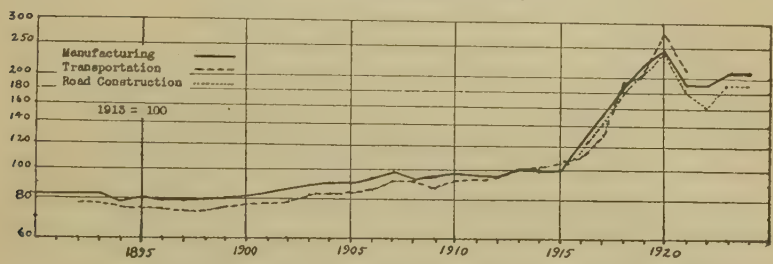
[2] A slight decrease in prices from 1890 to 1897, a gradual, steady increase from 1897 to 1914, a sharp, swift increase from 1914 to 1920, a drastic decrease in the two following years, and, what is perhaps a fifth tendency, slightly increasing prices in 1923 remaining approximately stable the two following years.

The chapter that follows will attempt the conversion of the money-wage index into an index of real wages.

CHART 15

COMPARISON OF THE RELATIVE FLUCTUATIONS IN THE MONEY WAGES OF UNSKILLED LABOR IN MANUFACTURING, TRANSPORTATION, AND ROAD CONSTRUCTION, 1890-1924

(SEMI-LOGARITHMIC SCALE)



CHAPTER V

The Real Wages of Unskilled Labor in Manufacturing, 1890-1924

An attempt will be made in this chapter to translate the index of money wages that has been computed into figures that will indicate the changes in the purchasing power of such wages. The importance of the figures that may be reached as a result of this attempt needs no emphasis. If the laborers' wages are increased 50 per cent while the cost of living increases 75 per cent, the working class soon realizes that something is wrong, that the increased wages only make conditions seem better, that in reality those things that can be bought with the weekly wage have grown less rather than more in amount. An increase in money wages means no gain for the wage earner unless the costs of the things that he purchases are either not increasing at all or are increasing at a slower rate than are his wages.

The method of changing the relative money wage figure that has been computed into a relative real wage figure needs no detailed explanation. Difficulties are concerned with the securing of data with which to make the adjustment rather than with the adjustment itself. Some definite and accurate quantitative measurement of the cost of living over the period covered by the study is desirable. The imperfection of those measurements that have been made is such as to render necessary a brief consideration of the indexes of the cost of living that may be used.

Of the theoretical basis of a cost-of-living figure little

need be said here. No index of the cost of living has approached the ideal one that might be outlined. Much remains to be done toward making cost-of-living indexes reveal more perfectly the changes in the articles that make up the customary list of articles consumed by typical groups, as well as indicating changes in the cost of any particular lot of articles.

There does not exist in the United States any cost-of-living index which has been computed on a uniform basis from 1890. The Bureau of Labor Statistics cost-of-living figures go back only as far as 1913.[1] They have been computed for from one to four months of each year since then and seem to give an indication that is fairly accurate of the alterations in living expenses. Figures are collected from thirty-two of the principal industrial centers of the country and are weighted on the basis of family budgets collected mainly in 1918. For the period prior to 1913 the cost of living must be represented chiefly by figures of the retail cost of food. It is unfortunate that the figures for other items in the total cost of living cannot be carried back over the whole period. The cost of food, however, occupies an important place in the budget of the average worker amounting in 1918 to from 34 per cent to 44 per cent of the total in various income groups and averaging 38 per cent.[2] If the retail price of food and the cost of living always showed the same variations, our data would be sufficient. The following table compares the Bureau of Labor Statistics indexes from 1913 to 1924.

In every case except one the two indexes move in the same direction, and except for the very severe depression in food prices during the years 1921-1923 the retail cost of food did not vary greatly from the cost of living in general.

[1] *Bulletin 357.*

[2] *Ibid.*, p. 5.

TABLE 10

CHANGES IN THE COST OF LIVING AND IN THE RETAIL COST OF FOOD, 1913-1924

1913 = 100

Year	Cost of living index[1]	Retail cost of food index[2]
1913	100	100
1914	102	102
1915	104	101
1916	112	114
1917	131	146
1918	159	168
1919	183	186
1920	208	203
1921	182	153
1922	168	142
1923	171	146
1924	171	146

Through 1919 food prices rose somewhat faster than the total of other items in the cost of living. Since 1920 food prices have declined much faster than other prices. Hence an index of real wages based on the retail prices of food alone would have underestimated an increased wage level for the laborer up to 1919 and since that year would have overestimated it.

Prior to 1913 an estimate of real wages must be based primarily on food prices as the indication of changes in the cost of living. The information that may be presented on food prices is not altogether satisfactory. The Bureau of Labor Statistics has computed an index of food prices back to 1890. Its index, however, does not represent the same articles during the whole period,—thirty being used from

[1] *Ibid.*, p. 466.

[2] *Bulletin 366*, p. 4. 1924 figure from *Monthly Labor Review*, vol. 21, p. 487.

1890 to 1907 and fifteen from 1907 to 1913. The information is given that "the index numbers for the period have been so computed as to be comparable with one another." [1] In their study of the movement of real wages, 1890-1918, Paul H. Douglas and Frances Lamberson have computed an index on the basis of the fifteen articles for which data exist through the whole period from 1890.[2] Table 11 compares their index, recomputed on a 1913 base, with the Bureau's index. In a recent article Alvin H. Hansen has estimated the trend of real wages making use of an index of cost of living of his own construction.[3] For the period from 1890 to 1913 this has been compiled by the use of prices of food (40), cloths and clothing (17), fuel and light (6), house furnishings (5). These weights are chosen roughly in accordance with the expenditures of workingmen's families as reported by the Bureau of Labor Statistics in 1919. The food portion of the index makes use of the retail prices compiled by the Bureau which have already been referred to, and the other series are found by using the relative prices of the groups of articles at wholesale. For the period 1913 to 1923 the cost of living data of the Bureau are used, interpolations being made to get consistent yearly averages.[4] The index numbers computed by Mr. Hansen on the basis of the above data also appear in Table 11.

The table contains three series on which may be based a study of the changes in living costs and which may be used with the index of unskilled wages to determine the trend of real unskilled wages over the period from 1890 to 1924. It will be necessary to choose one of the cost series as the basis for further computations. Over most of the period

[1] *Ibid.*, pp. 48, 49.

[2] *American Economic Review*, vol. xi, pp. 409-426.

[3] *American Economic Review*, vol. xv, pp. 27-42.

[4] *American Economic Review*, vol. xv, p. 294.

TABLE II

INDEXES OF RETAIL PRICES, 1890-1924[1]

1913 = 100

Year	Douglas-Lamberson Index of Retail Food Prices	Bureau of Labor Statistics Index of Retail Food Prices	Hansen Index of the Cost of Living
1890	65	70	77
1891	66	71	76
1892	65	69	75
1893	67	71	76
1894	64	68	71
1895	62	67	70
1896	61	65	69
1897	62	65	67
1898	64	67	69
1899	65	68	72
1900	66	69	76
1901	70	72	75
1902	74	75	78
1903	74	75	81
1904	75	76	81
1905	75	76	81
1906	77	79	85
1907	81	82	90
1908	84	84	87
1909	88	89	91
1910	93	93	94
1911	92	92	92
1912	99	98	96
1913	100	100	100
1914	102	102	102
1915	101	101	104
1916	114	114	111
1917	150	146	131
1918	171	168	159
1919	...	186	183
1920	...	203	208
1921	...	153	182
1922	...	142	168
1923	...	146	171
1924	...	146	171

[1] Douglas–Lamberson Index from "The Movement of Real Wages, 1890-1918," in *American Economic Review*, vol. xi, pp. 409-426 (1921). Bureau of Labor Statistics Index in *Bulletin 366, Retail Prices, 1913 to December, 1923*, p. 49 (1924 figure from *Monthly Labor Review*, vol. xxi, p. 487). Hansen Index from "Factors Affecting the Trend of Real Wages," in *American Economic Review*, vol. xv, pp. 27-42 (1925).

there seems little choice. The general variations in the series seem to correspond rather closely. It should be noted that the Hansen index and the cost of living index in Table 10 differ only in the fact that the author's interpolations give a slightly different result for a single year. The Douglas-Lamberson index shows a slightly greater increase in food costs over the whole period covered than does the Bureau index, but the two show almost no variations since 1900. In order to be more conservative in estimating the changes that have occurred, it would probably be better to use the Bureau's index which covers more articles during the decade when these two indexes show the greatest difference.

The choice then is narrowed down to the Hansen cost of living index or the Bureau's retail food index. From the general point of view of either theory or practice an index of the cost of living is preferable to one of food alone. Does the Hansen index satisfy the tests which should be applied to a cost of living index? Its compiler would be the last to claim perfection or close accuracy for it.[1] It does, however, give some weight to certain factors in living costs other than foods. The facts that foods in general rose over 40 per cent in retail prices during the years from 1890 to 1910, and that raw products at wholesale rose approximately the same amount, while manufactured products at wholesale had an increase of only 15 per cent are not definite proof of the difference that has been mentioned, but they are strong indications which are given additional weight by the results of the Hansen index. Chart 16 compares the retail food price index of the Bureau with the Hansen index. Prior to 1911 the food index is slightly lower, but variations

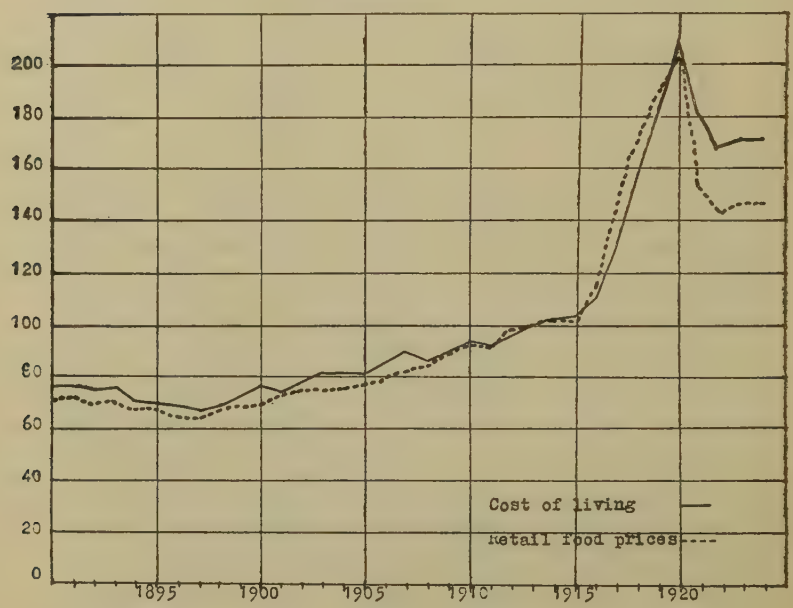
[1] Mr. Hansen wrote in the *American Economic Review*, vol. xv, p. 29, "It is not possible to get a thoroughly reliable index of the cost of living prior to 1913."

in the two indexes were approximately equivalent. Subsequent to 1911 food prices rose slightly faster than general living costs until 1920. Beginning with that year food prices fell below the general retail price level, and after 1921

CHART 16

COST OF LIVING INDEX (HANSEN'S) COMPARED WITH AN INDEX OF RETAIL FOOD PRICES, 1890-1924

1913 = 100



the difference in the two indexes becomes important amounting to from 15 to 20 per cent. Up to 1916 little difference in the result would come from using either index. The influence of the items selected by Mr. Hansen probably makes his results somewhat closer to those that would be reached if all the factors in the cost of living could be included. In view of this and of the fact that the Bureau's cost of living index is the logical one to use after 1913 it seems desirable to use the Hansen series from 1890 to 1913.

TABLE 12

REAL WAGES OF UNSKILLED LABOR IN MANUFACTURING, 1890-1924.
1913 = 100

Year	Index of money wages	Index of the cost of living[1]	Index of real wages
1890	82	77	106
1891	82	76	108
1892	82	75	109
1893	82	76	108
1894	78	71	110
1895	80	70	114
1896	79	69	114
1897	78	67	116
1898	80	69	116
1899	81	72	111
1900	82	76	108
1901	84	75	112
1902	86	78	110
1903	89	81	110
1904	90	81	111
1905	90	81	111
1906	94	85	111
1907	98	90	109
1908	93	87	107
1909	94	91	103
1910	97	94	103
1911	94	92	102
1912	95	96	99
1913	100	100	100
1914	100	102	98
1915	100	104	96
1916	122	111	110
1917	150	131	115
1918	188	159	118
1919	217	183	119
1920	246	208	118
1921	191	182	105
1922	188	168	112
1923	206	171	120
1924	206	171	120

[1] The Hansen-Bureau of Labor Statistics index described in the text.

Table 12 contains figures describing the real wages of unskilled labor since 1890. The index is computed from the Hansen series and the unskilled wages index computed in Chapter IV. Chart 17 shows the resulting index graphically. Only a brief description of the course of the index with suggestions of events that have accompanied its changes will be attempted here.

The early years of the period reveal a gradually rising level of real wages reaching a high point in 1897 and 1898. From the latter year there appeared an almost steady decline to the beginning of the war period. The only marked deviations from this decline appeared in 1901 when there was a recovery from the particularly sharp decline of the previous year, and in 1904 and 1913 when there were slight increases. With the war period there began in 1916 a sharp rise in real wages, amounting to 10 per cent in that year and reaching its peak in 1919 at a point 19 per cent above the 1913 level.[1] The abrupt decline in 1921 was followed by a recovery in 1922 which continued through the next year. 1924 showed practically no change from the preceding year and the period ended with real wages at a point 20 per cent above the 1913 level.

A comparison of the first ten years of the period covered by the index with the last five years (i. e., the years 1890-1899 with 1920-1924) is of interest. In the first place the difference in the level of real wages is not great. The war period did bring unskilled wages to the highest point in thirty-five years, but it did not do much more than to restore them to the level of the last decade of the last century. From 1890 to 1899 the level of real unskilled wages averaged about 11 per cent above their 1913 point and in the years

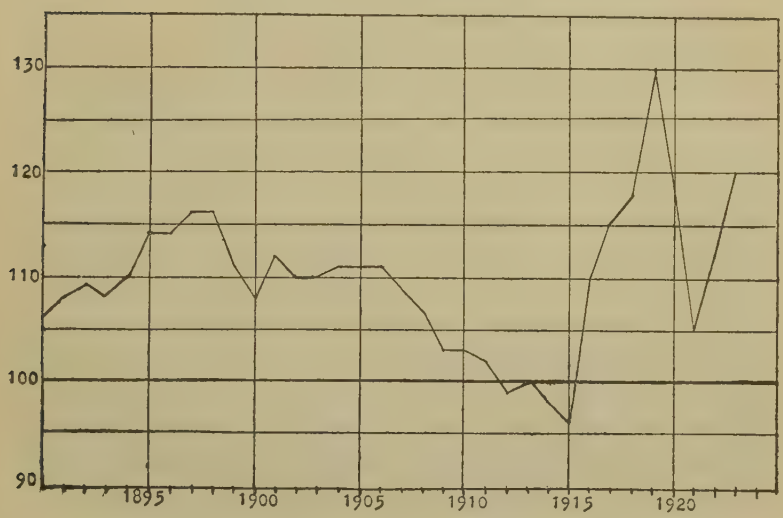
[1] The reader is reminded of the derivation of the 1919 wage figure which was described in the preceeding chapter. It is the least reliable of any of the wage figures used.

from 1920 to 1924 they averaged 15 per cent above 1913. That is, unskilled labor received in purchasing power during the last five years less than 4 per cent more than it was receiving twenty-five to thirty-five years ago. Even if the maximum figures, those for the last two years, are considered

CHART 17

RELATIVE FLUCTUATIONS IN THE REAL WAGES OF UNSKILLED LABOR, 1890-1924

1913 = 100



alone, it will be found that the gain of the first quarter of the century amounts to only 8 per cent. Apparently the increase in production that has taken place during the period has not contributed its share toward the increase of the wages of unskilled labor.

It will be noticed that the years of poor business are not particularly marked by low levels in real unskilled wages. This is explained in part by the fact that the data used in the study are the full-time weekly wage rates of those actually employed. Hence unemployment has no direct effect on the

figures that are used. Indirectly it will, of course, tend to reduce the wages of those who continue to be employed. The drop in prices which occurs in such years tends to counteract this. An index of real wages cannot be deemed wholly satisfactory unless it takes into consideration the loss of wages that comes from unemployment as well as increases or decreases in the actual wages paid. For the present study the computation of an index of unskilled employment seems impossible. The results that have been described should be considered with this fact in mind. They tell part of the story, but not all of it.

There are certain factors connected with real wages which have not been measured by the computation that has been made and which deserve some consideration.[1] The average number of persons dependent on the earnings of the unskilled laborer has undoubtedly decreased since the end of the last century. The average size of American families has decreased.[2] It is impossible even to estimate the amount that the decrease has influenced the unskilled group, but the general decrease has been reflected in that group as elsewhere. In addition to this there has been an increase in the number gainfully employed.[3] Here again no exact information with reference to the particular group that is being considered seems possible, but it has certainly been influenced by this increase. So it seems probable that the actual

[1] Much of this material was put into definite form by Paul H. Douglas in his paper on the movement of real wages before the American Economic Association at its 1925 meeting. *Vide* his article "The Movement of Real Wages and its Economic Significance" in *American Economic Review*, vol. xvi, Suppl., pp. 17-53.

[2] The census "economic family" consisted of 4.9 persons in 1890 and 4.3 persons in 1920. *14th Census of the United States*, 1920, vol. ii, p. 1266.

[3] 39.4 per cent of the total population in 1920 and 37.2 per cent in 1890 were gainfully employed. *Ibid.*, vol. iv, p. 33.

amount of purchasing power available for each unskilled laborer and his dependents has increased more than the figures would indicate. This is offset by a possible decrease in the regularity of employment and by the fact that during the last twenty-five years the unskilled laborer has become to an increasing extent a city dweller. In the earlier period his income could be considerably eked out by garden produce or similar products. To an increasing extent the urbanization of American life makes such additions impossible.

The method by which cost of living indexes in general, and particularly the one which has been used in this chapter, are computed makes necessary the mention of possible additional qualifications of the results. Rising prices will tend to cause changes in standards of consumption. These changes will particularly affect the articles which have had the greatest rise in prices. The cost of living indexes fail to record such changes unless the index is constantly being revised on the basis of the new articles which are substituted for those formerly used. The difficulties involved in making such changes are numerous and formidable. If the substitution brings no loss to the physical or psychic well-being of the consumer, a certain amount of the rise of prices has been counteracted. Changed standards of consumption are particularly in evidence when food prices are rising. Housewives attempt to make a definite sum suffice for the necessary supply of food. Cheaper cuts of meat, or less of it, oleomargarine in place of butter, and many similar changes will be made. When clothing prices increase, the family bill will be reduced by the purchase of cheaper grades, or by wearing that which is already owned for a longer time. When such changes involve a distinct reduction in living standards they ought not to be considered in the revision of a cost of living index. There may be some that bring no real loss, or possibly some gain, in well being, and such

may make the ordinary cost of living index overestimate the rise in the price level.

It is probable that these qualifications are of less importance in considering the lowest wage groups than in the higher wage ranges. Where the wage of an unskilled laborer forms the whole or a major part of a family's income, an increase in prices without a compensating increase of wages will curtail quantity rather than quality of the necessaries of life. On the basis of figures that have been computed in the previous chapter it will be found that the unskilled wage earner who worked fifty-two weeks a year in 1924 received an annual average income of $1,133. The qualifications that must condition the acceptance of such a figure have been amply explained. The assumption of a fifty-two week working year insures the figure against any tendency toward underestimation. The lack of adequate employment statistics makes a closer approximation impossible, but the amount of unemployment that characterizes industry in general would make a material reduction in the figure necessary if it is to be fairly representative. A comparison of such a wage figure with definite budget studies of the cost of subsistence in distinct sections of the country would introduce unjustifiable generalizations. Recent studies have found figures in excess of the income mentioned to be the lowest subsistence level for various sections of the country. It is plain from this that the changes which the family of the unskilled laborer must make as a result of rising prices are such that the failure of cost of living indexes to record changes in the articles of consumption used by the ordinary family does not invalidate the comparison between the cost of living and the wage index. The rising cost of living is to some extent overemphasized by any cost of living index, but there is apt to be less error involved in the group under consideration than in the more fortunate groups of industrial society.

There are certain factors that may have increased the real income of the unskilled laborer by affecting his psychic rather than his money income. The decrease in the hours of labor that has characterized the period adds to the possibility of more enjoyment of life or of training for better jobs, both of which are as important parts of real income as additional goods would be. The urbanization of the worker which has added certain money costs to his living has made many pleasures possible which did not exist in the small town and city life of the earlier period. It has also done much to add to the congestion which is such an unwholesome feature of our modern city life. Finally there has been a large increase in the social expenditure of all governmental units, and the advantages the laborer receives from this are properly considered a part of his income. It is impossible on the basis of the real money incomes of men to gain a complete idea of their increase or decrease in living standards. Other factors which are not easily, or at all, convertible into quantitative terms need to be considered. The fact, however, remains that money incomes converted into terms of real purchasing power are the most important indications of the status of any particular group in society and so the measurement of such incomes deserves wide attention.

APPENDIX[1]

Table A

Annual Average Unskilled Wages, by Industries, 1890-1903

Industries	1890			1891		
	Establishments	Unskilled Employees	Average Weekly Wage	Establishments	Unskilled Employees	Average Weekly Wage
Blast Furnace	19	512	$11.80	19	514	$11.91
Brick	11	286	7.77	11	297	7.69
Building	146	5118	8.91	146	4861	8.91
Carpets	6	224	8.70	6	204	8.76
Cars	11	793	7.64	11	834	7.60
Cotton Goods	6	63	7.31	6	64	7.35
Dyeing	11	805	7.86	11	924	7.68
Flour	7	143	9.17	7	145	9.17
Foundry	128	3651	8.30	128	3564	8.58
Gas	3	73	9.24	3	48	9.18
Glass	2	42	8.04	2	42	8.04
Leather	19	407	8.29	19	411	8.44
Liquors, Distilled	2	33	8.55	2	35	8.53
Lumber	17	1123	8.53	17	1186	8.46
Marble	18	214	9.16	18	208	8.79
Paper and Pulp	4	201	8.53	4	193	8.64
Planing	13	220	6.75	13	230	6.96
Rope	1	51	8.40	1	48	8.46
Shipbuilding	3	148	8.38	3	52	9.92
Slaughtering	4	3785	10.20	4	3885	10.20
Soap	2	183	9.85	2	193	9.90
Streets—Contract	36	3293	8.79	36	3917	9.04
Streets—Municipal	47	8938	10.06	47	8975	9.97
Tobacco	2	34	6.11	2	35	6.16
Petroleum	. . .	. . . .	. . .	. . .	. . . .	. . .
Total	. . .	30,339	. . .	. . .	30,865	. . .

[1] The data contained in the tables in the appendix are those used in the computation of the weighted index and the weighted average wage. In a few cases slightly different data are used in computing the other indexes and averages.

TABLE A—*Continued*

Industries	1892			1893		
	Establishments	Unskilled Employees	Average Weekly Wage	Establishments	Unskilled Employees	Average Weekly Wage
Blast Furnace	19	588	$12.26	19	547	$12.06
Brick	11	302	7.69	11	311	7.60
Building	146	4812	8.97	146	4516	8.76
Carpets	6	176	8.96	6	196	8.76
Cars	11	805	7.70	11	790	8.51
Cotton Goods	7	61	7.22	7	54	7.16
Dyeing	11	888	7.78	11	890	7.85
Flour	7	146	9.17	7	149	9.22
Foundry	128	3672	8.64	128	3502	8.57
Gas	3	46	8.82	3	40	9.36
Glass	2	42	8.04	2	42	8.04
Leather	19	452	8.45	19	455	8.35
Liquors, Distilled	2	35	8.53	2	32	8.63
Lumber	17	1143	8.42	17	1150	8.33
Marble	18	221	9.09	18	211	9.23
Paper and Pulp	4	175	8.76	4	177	8.67
Planing	13	227	6.68	13	223	6.43
Rope	1	79	8.40	1	80	8.52
Shipbuilding	3	61	9.37	3	50	9.75
Slaughtering	4	4035	9.79	4	3955	10.26
Soap	2	203	9.90	2	153	9.00
Streets—Contract	36	3614	9.04	36	3531	8.84
Streets—Municipal	47	9849	9.88	47	10290	9.93
Tobacco	2	35	6.32	2	37	6.22
Petroleum	. . .	. . . .	. . .	. . .	. . . .	. . .
Total	. . .	31,667	. . .	. . .	31,381	. . .

TABLE A—*Continued*

Industries	1894			1895		
	Establishments	Unskilled Employees	Average Weekly Wage	Establishments	Unskilled Employees	Average Weekly Wage
Blast Furnace	18	551	$10.30	18	556	$11.05
Brick	11	314	7.48	11	310	7.35
Building	146	4128	8.35	146	3796	8.48
Carpets	6	168	8.33	6	187	8.29
Cars	11	527	7.37	11	610	7.37
Cotton Goods	7	49	6.64	7	48	6.41
Dyeing	11	831	7.49	11	831	7.65
Flour	7	148	9.24	7	155	9.33
Foundry	128	2887	8.22	128	3335	8.33
Gas	3	84	9.72	3	58	9.18
Glass	2	35	7.92	2	38	7.74
Leather	19	434	7.89	19	438	7.80
Liquors, Distilled	2	52	8.59	2	38	8.56
Lumber	17	1220	7.96	17	1216	7.76
Marble	18	190	8.86	18	190	8.82
Paper and Pulp	4	171	8.70	4	183	8.92
Planing	13	240	6.20	13	261	6.38
Rope	1	53	8.52	1	76	8.58
Shipbuilding	3	53	9.95	4	51	10.32
Slaughtering	4	4435	9.24	4	4505	9.24
Soap	2	163	9.27	2	173	9.30
Streets—Contract	36	3452	8.90	36	2932	9.04
Streets—Municipal	4	11987	10.14	48	11052	10.90
Tobacco		37	7.03	2	37	7.03
Petroleum		214	10.98	1	209	10.74
Total	. . .	32,423	. . .	. . .	31,285	. . .

TABLE A—*Continued*

Industries	1896			1897		
	Establishments	Unskilled Employees	Average Weekly Wage	Establishments	Unskilled Employees	Average Weekly Wage
Blast Furnace	19	544	$11.48	19	544	$10.62
Brick	11	299	7.44	11	299	7.44
Building	146	4018	8.36	146	4000	8.47
Carpets	6	183	8.70	6	165	8.95
Cars	11	779	7.41	11	620	7.37
Cotton Goods	7	52	6.56	7	47	6.72
Dyeing	11	839	7.85	11	870	7.69
Flour	7	209	9.64	7	210	9.64
Foundry	128	3480	8.38	128	3343	8.41
Gas	3	47	9.66	3	115	9.66
Glass	2	45	7.74	2	50	8.04
Leather	19	412	7.81	19	435	7.96
Liquors, Distilled	2	34	8.54	2	50	8.54
Lumber	17	1171	7.89	17	1212	7.68
Marble	18	196	8.88	18	201	8.97
Paper and Pulp	4	160	8.98	4	166	8.92
Planing	13	269	6.31	13	265	6.32
Rope	1	79	8.58	1	64	8.40
Shipbuilding	4	46	10.00	4	57	9.90
Slaughtering	4	4505	9.18	4	4815	9.24
Soap	2	173	9.60	2	172	9.60
Streets—Contract	36	3183	9.36	36	2754	9.21
Streets—Municipal	48	10,248	9.84	48	10,861	9.86
Tobacco	2	39	6.93	3	40	7.74
Petroleum	1	187	10.80	1	194	10.74
Total	. . .	31,197	. . .	. . .	31,549	. . .

TABLE A—*Continued*

Industries	1898			1899		
	Establishments	Unskilled Employees	Average Weekly Wage	Establishments	Unskilled Employees	Average Weekly Wage
Blast Furnace	19	564	$10.68	19	577	$11.85
Brick	11	305	7.29	11	327	7.46
Building	146	4524	8.58	146	4822	8.57
Carpets	6	173	8.82	6	179	8.82
Cars	11	823	7.40	11	930	7.38
Cotton Goods	7	49	6.89	7	50	6.78
Dyeing	11	826	7.88	11	859	7.85
Flour	7	227	9.69	7	224	9.62
Foundry	128	3881	8.38	128	4263	8.46
Gas	3	122	9.24	3	71	9.48
Glass	2	79	7.98	2	79	7.98
Leather	19	494	7.76	19	499	7.84
Liquors, Distilled	2	42	8.66	2	42	8.54
Lumber	17	1305	7.90	17	1314	8.15
Marble	18	199	8.98	18	190	8.10
Paper and Pulp	4	150	8.94	4	192	9.30
Planing	13	274	6.68	13	348	7.16
Rope	1	50	8.58	1	53	8.58
Shipbuilding	4	75	9.83	4	122	9.90
Slaughtering	4	4965	9.64	4	5590	9.84
Soap	2	193	9.60	2	183	9.60
Streets—Contract	36	2619	9.32	36	2884	9.49
Streets—Municipal	48	10,649	9.94	48	11,269	10.10
Tobacco	3	41	7.96	3	47	7.90
Petroleum	1	145	10.86	1	156	10.54
Total	. . .	32,774	. . .	. . .	35,270	. . .

TABLE A—*Continued*

Industries	1900			1901		
	Establishments	Unskilled Employees	Average Weekly Wage	Establishments	Unskilled Employees	Average Weekly Wage
Blast Furnace	19	573	$12.24	19	585	$12.35
Brick	11	318	7.61	11	322	7.72
Building	146	5275	8.51	146	4648	9.16
Carpets	6	181	8.76	6	180	8 76
Cars	11	1119	7.64	11	1095	7.66
Cotton Goods	7	55	7.04	7	56	7.06
Dyeing	11	857	8.10	11	968	8 00
Flour	7	225	9.69	7	236	10.63
Foundry	128	4513	8.66	128	4825	8.66
Gas	3	97	9.00	3	78	9.84
Glass	2	86	8.04	2	56	8.40
Leather	19	483	8.14	19	506	8.20
Liquors, Distilled	2	35	8.59	2	56	9.39
Lumber	17	1446	8.25	17	1560	8.48
Marble	18	173	8.87	18	216	9.32
Paper and Pulp	4	181	9.40	4	238	9.33
Planing	13	282	6.72	13	344	7.27
Rope	1	49	8.58	1	53	8.52
Shipbuilding	4	207	9.82	4	179	9.91
Slaughtering	4	5800	9.54	4	6110	9.42
Soap	2	163	9.90	2	163	9.90
Streets—Contract	36	3198	9.63	36	3222	10.09
Streets—Municipal	47	11,102	10.26	47	11,665	10.23
Tobacco	3	50	8.08	3	51	8 30
Petroleum	1	226	10.37	1	260	10.37
Total	. . .	36,694	. . .	. . .	37,672	. . .

TABLE A—*Continued*

Industries	1902			1903		
	Establishments	Unskilled Employees	Average Weekly Wage	Establishments	Unskilled Employees	Average Weekly Wage
Blast Furnace	19	549	$12.61	18	523	$12.94
Brick	11	367	8.13	11	363	8.32
Building	146	5317	9.30	146	5082	9.48
Carpets	6	206	8.69	6	215	9.06
Cars	11	905	7.83	11	1058	8.11
Cotton Goods	7	65	7.33	19	505	8.64
Dyeing	11	953	8.09	11	1035	8.19
Flour	7	236	10.72	7	231	10.72
Foundry	128	5106	8.77	128	5489	9.02
Gas	3	95	9.30	3	128	9.24
Glass	2	53	8.46	2	53	9.42
Leather	19	484	8.49	19	505	8.64
Liquors, Distilled	2	48	9.45	2	56	9 39
Lumber	17	1646	8.74	17	1694	8.86
Marble	18	218	9.53	18	192	9.89
Paper and Pulp	4	209	9.32	4	225	10.11
Planing	13	327	7.27	13	296	7.45
Rope	1	61	8.64	1	57	8.58
Shipbuilding	4	169	10.45	4	140	10.70
Slaughtering	4	6420	9.84	4	6360	10.50
Soap	2	163	9.90	2	167	10.50
Streets—Contract	36	3243	10.40	36	3345	10.77
Streets—Municipal	48	10,354	10.25	48	9731	10.25
Tobacco	3	45	8.78	3	52	8.49
Petroleum	1	230	10.48	1	240	10.26
Total	. . .	37,469	. . .	. . .	37,742	. . .

TABLE B

ANNUAL AVERAGE UNSKILLED WAGES, BY INDUSTRIES, 1903-1907

Industries	1903			1904		
	Establishments	Unskilled Employees	Average Weekly Wage	Establishments	Unskilled Employees	Average Weekly Wage
Blast Furnace	22	682	$13.37	23	687	$12.76
Brick	38	1058	9.08	47	1083	9.21
Building	172	5932	9.86	192	6228	10.25
Carpets	6	215	9.06	6	371	9.63
Cars	41	7304	8.65	42	7348	8.62
Cotton Goods	5	45	7.69	8	384	7.76
Dyeing	13	985	8.10	14	1069	7.95
Flour	31	998	10.37	45	1487	10.61
Foundry	186	7994	9.05	192	7834	9.06
Gas	23	1957	10.74	61	4636	10.44
Glass	12	211	8.67	24	506	8.96
Leather	37	655	9.09	52	1003	8.88
Lumber	42	3463	9.12	64	5796	9.55
Marble	62	604	11.70	91	814	11.07
Paper and Pulp	16	651	9.42	28	1279	9.15
Planing	80	1592	8.75	91	2380	8.78
Shipbuilding	17	1764	8.56	33	3069	8.68
Slaughtering	13	9865	10.36	15	10592	10.56
Streets—Contract	70	8254	10.33	120	13100	10.31
Streets—Municipal	58	13396	10.58	70	18750	10.61
Total	. . .	67,625	. . .	. . .	88,416	. . .

TABLE B—*Continued*

Industries	1905			1906		
	Establishments	Unskilled Employees	Average Weekly Wage	Establishments	Unskilled Employees	Average Weekly Wage
Blast Furnace	25	727	$13.21	26	805	$13.10
Brick	49	1332	9.41	54	1518	10.48
Building	193	6028	10.08	190	6954	10.74
Carpets	6	309	9.81	6	226	9.36
Cars	45	8409	8.58	47	8814	8.80
Cotton Goods	8	382	7.82	9	418	8.19
Dyeing	17	1296	7.99	17	1343	8.14
Flour	45	1541	10.57	46	1632	10.56
Foundry	198	8950	9.18	211	9704	9.53
Gas	60	5758	10.71	60	6633	11.11
Glass	26	844	8.94	30	1410	9.03
Leather	55	1057	8.85	60	975	9.43
Lumber	66	6436	9.76	72	7533	10.45
Marble	101	908	11.00	124	1167	10.94
Paper and Pulp	27	1314	9.23	28	1096	9.30
Planing	98	2722	8.92	107	3300	9.22
Shipbuilding	35	3859	8.78	35	4174	9.17
Slaughtering	15	10817	10.08	15	10979	10.26
Streets—Contract	128	14436	10.39	131	14800	11.17
Streets—Municipal	70	22076	10.71	72	25147	10.93
Total	. . .	99,201	. . .	. . .	108,628	. . .

TABLE B—*Continued*

Industries	1907		
	Establishments	Unskilled Employees	Average Weekly Wage
Blast Furnace	26	874	$13.76
Brick	54	1506	10.76
Building	190	7366	11.11
Carpets	6	253	9.48
Cars	47	9757	9.00
Cotton Goods	9	443	8.75
Dyeing	17	1393	8.49
Flour	46	1774	10.88
Foundry	211	9858	9.83
Gas	60	6248	11.32
Glass	30	1564	9.75
Leather	60	925	9.66
Lumber	72	7156	10.87
Marble	124	1154	11.34
Paper and Pulp	28	1193	9.42
Planing	107	3308	9.51
Shipbuilding	35	4306	9.56
Slaughtering	15	11288	10.53
Streets—Contract	131	14072	11.55
Streets—Municipal	72	28179	11.52
Total	....	112,617	....

TABLE C

ANNUAL AVERAGE UNSKILLED WAGES, BY INDUSTRIES, 1907-1919

Industries	1907			1908		
	Establishments	Unskilled Employees	Average Weekly Wage	Establishments	Unskilled Employees	Average Weekly Wage
Boots and Shoes	17	726	$15.64	17	694	$15.10
Car Building	20	4671	10.14	20	1907	10.47
Cotton Manufacturing	36	704	7.15	36	747	6.93
Hosiery and Knit Goods	8	235	12.54	8	245	11.92
Iron and Steel	44	5463	12.71	44	3863	11.62
Lumber	41	4097	11.07	41	3662	10.12
Mill-work	60	1578	9.07	60	1300	9.02
Silk	4	1231	10.34	4	888	11.21
Woolen and Worsted	19	631	8.09	19	550	7.82
Total	. . .	19,336	. . .	. . .	13,856	. . .
	1909			1910		
Boots and Shoes	17	743	$16.06	44	1616	$15.37
Car Building	20	2963	10.16	60	10,114	9.78
Cotton Manufacturing	36	798	7.01	59	1385	6.89
Hosiery and Knit Goods	8	260	11.60	34	963	10.85
Iron and Steel	44	4908	11.91	135	11,882	12.62
Lumber	41	3910	10.35	41	4582	11.07
Mill-work	60	1451	9.22	223	4885	9.73
Silk	4	1355	11.16	8	1746	10.99
Woolen and Worsted	19	677	7.80	27	1144	7.90
Total	. . .	17,065	. . .	. . .	38,317	. . .

TABLE C—*Continued*

Industries	1911			1912		
	Establishments	Unskilled Employees	Average Weekly Wage	Establishments	Unskilled Employees	Average Weekly Wage
Boots and Shoes	63	1224	$14.89	73	1685	$14.26
Car Building	68	8001	9.69	72	8546	10.04
Cotton Finishing	30	2180	8.12	30	2286	8.41
Cotton Manufacturing	88	2159	6.92	88	2193	7.42
Hosiery and Knit Goods	33	1020	10.74	41	1357	11.70
Iron and Steel	139	9651	12.28	141	10,793	12.58
Lumber	245	19,256	10.10	361	29,365	10.03
Mill-work	253	4456	9.86	319	4641	10.15
Silk	11	2516	11.15	12	2739	11.68
Woolen and Worsted	45	1624	8.09	45	1686	8.44
Total	. . .	52,087	. . .	. . .	65,291	. . .
	1913			1914		
Boots and Shoes	73	1697	$15.35	70	1817	$15.42
Car Building	72	9818	10.58			
Cotton Finishing	33	2256	8.44	53	2504	8.43
Cotton Manufacturing	90	2240	7.73	90	2363	8.00
Hosiery and Knit Goods	41	1374	12.06	49	1420	12.52
Iron and Steel	164	12,706	13.88	221	11,629	13.32
Lumber	361	28,835	10.40	*	*	10.06
Mill-work	317	5267	10.34	*	*	10.37
Silk	12	2625	11.67	14	3257	12.12
Woolen and Worsted	46	1485	8.61	47	2053	8.68
Total	. . .	68,303	. . .	. . .	25,043	. . .

* Not reported in year designated. Average weekly wage estimated by interpolation.

TABLE C—*Continued*

Industries	1915			1916		
	Establishments	Unskilled Employees	Average Weekly Wage	Establishments	Unskilled Employees	Average Weekly Wage
Boots and Shoes	*	*	$15.70	124	2453	$15.97
Cotton Finishing	*	*	9.12	37	2506	9.80
Cotton Manufacturing	*	*	8.65	106	3407	9.30
Hosiery and Knit Goods						
Iron and Steel	221	10,834	13.23	*	*	17.86
Lumber	348	36,569	9.58			
Mill-work	329	5224	10.40			
Woolen and Worsted	*	*	9.68	55	2654	10.69
	1917			1918		
Boots and Shoes	*	*	$18.46	125	2113	$20.94
Cotton Finishing	*	*	12.36	34	2619	14.92
Cotton Manufacturing	*	*	11.86	106	2712	14.42
Hosiery and Knit Goods						
Iron and Steel	63	5379	22.49	*	*	28.65
Lumber						
Mill-work						
Woolen and Worsted	*	*	13.52	55	2646	16.36

* Not reported for the year designated. Average weekly wage estimated by interpolation.

TABLE C—*Continued*

Industries	1919		
	Establishments	Unskilled Employees	Average Weekly Wage
Boots and Shoes	*	*	$26.69
Cotton Manufacturing	*	*	20.44
Hosiery and Knit Goods	30	875	23.46
Iron and Steel	121	13,093	34.81
Lumber	141	15,542	19.70
Woolen and Worsted	*	*	20.98

* Not reported for the year designated. Average weekly wage estimated by interpolation.

TABLE D

ANNUAL AVERAGE UNSKILLED WAGES, BY INDUSTRIES, 1914, 1920-1924[1]

(IN DOLLARS)

Industries	1914	1920	1921	1922	1923	1924
Agricultural Implements	12.04	29.70	19.53	19.78	22.43	22.90
Automobiles	11.17	30.10	23.30	22.82	24.00	25.75
Boots and Shoes	9.64	19.34	18.26	17.96	17.55	17.94
Chemicals	12.48	26.48	22.26	22.84	25.59	26.08
Cotton, Northern	8.89	23.96	17.52	18.58	19.79	18.76
Cotton, Southern	4.83	17.27	13.64	13.28	13.49	12.00
Electrical Apparatus	11.47	27.23	19.98	17.94	20.84	21.20
Fertilizer	9.37	22.68	13.98	14.04	15.88	15.96
Foundries	10.89	27.72	19.98	21.40	23.68	23.61
Furniture	7.80	21.22	17.84	18.11	19.00	20.05
Hosiery and Knit Goods	9.79	23.20	18.74	15.78	17.31	16.74
Iron and Steel	11.20	33.49	22.06	23.13	26.60	26.51
Leather	10.48	26.14	20.00	19.26	21.26	21.88
Lumber	10.44	22.56	18.48	16.56	18.49	17.78
Meat Packing	10.22	26.09	21.75	19.04	21.24	22.26
Mill Work	10.44	22.56	18.48	16.56	18.49	17.78
Paint and Varnish	15.16	27.98	24.20	23.52	24.93	23.41
Paper Products	11.00	25.50	20.52	20.66	22.27	23.37
Printing and Publ.—Book	9.73	22.06	20.37	20.99	20.48	21.44
Printing and Publ.—Newspaper	8.89	20.20	20.13	19.66	21.72	22.60
Pulp and Paper	11.72	26.92	21.77	21.25	22.59	21.75
Rubber	11.10	27.94	21.16	23.05	25.23	25.46
Silk	12.60	23.38	21.70	21.09	24.11	24.66
Wool	9.36	23.75	21.26	21.30	22.72	21.19

[1] Computed from the wage studies of the National Industrial Conference Board. While no establishment or number of unskilled employee figures are reported for the individual industries, some idea of their comprehensiveness may be gained from the fact that in 1924 the plants covered employed some 743,227 skilled and unskilled workers "which is equivalent to approximately 20% of the wage earners reported by the 1919 Census of Manufactures for the twenty-three industries studied".

TABLE E

DERIVATION OF WEIGHTS USED IN THE COMPUTATION OF THE WEIGHTED UNSKILLED WAGES SERIES, 1890-1924 [1]

Industries	1889		1899	
	Wage earners [2]	Weights [3]	Wage earners	Weights
Blast Furnaces [4]	138	69	183	92
Brick	123	62	106	53
Building	544*	136	680*	170
Carpets	29	7	28	7
Cars	80	20	218	54
Cotton Goods	290*	72	303	76
Dyeing	20	15	30	24
Flour	28*	7	32	8
Foundry and Machine Shop	287	72	427	107
Gas	13	6	22	11
Glass	45	11	53	13
Leather	42	10	52	13
Liquor	5	1	4	1
Lumber	444	222	413	206
Marble	33	16	42	21
Paper and Pulp	31	8	50	12
Planing	80	20	74	18
Rope	16	4	21	5
Shipbuilding	44	11	47	12
Slaughtering	44	22	68	34
Soap	8*	2	10*	2
Streets—Contract	70*	70	80*	80
Streets—Municipal	70*	70	80*	80
Tobacco	117	29	133	33
Petroleum	11	6	12	6
Boots and Shoes				
Hosiery and Knit Goods				
Silk				
Wool				

* Estimated.

[1] The figures for wage earners are taken from the Census of Manufactures.

[2] To the nearest thousand.

[3] The weights are derived by dividing the industries into four groups based on the relative importance of unskilled labor in each and by then taking 100, 75, 50 or 25% of the total wage-earner figure.

[4] Representing the iron and steel industry as a whole.

TABLE E—*Continued*

Industries	1904		1909	
	Wage earners	Weights	Wage earners	Weights
Blast Furnaces	207	103	240	120
Brick	118	59	133	66
Building	767	192	854	214
Carpets	33	8	33	8
Cars	287	72	351	88
Cotton Goods	316	79	379	95
Dyeing	36	27	44	33
Flour	39	10	39	10
Foundry and Machine Shop	443	111	531	133
Gas	31	16	37	18
Glass	64	16	69	17
Leather	57	14	62	16
Liquor	5	1	6	2
Lumber	404	202	547	274
Marble	51	26	66	33
Paper and Pulp	66	16	76	19
Planing	98	24	112	28
Rope	25	6	25	6
Shipbuilding	51	13	41	10
Slaughtering	74	37	88	44
Soap	11	3	13	3
Streets—Contract	85*	85	90	90
Streets—Municipal	85*	85	90	90
Tobacco	159	40	167	42
Petroleum	17	8	14	7
Boots and Shoes	150	38	185	46
Hosiery and Knit Goods	104	26	129	32
Silk	80	20	100	25
Wool	180	45	202	50

TABLE E—*Continued*

Industries	1914		1919	
	Wage earners	Weights	Wage earners	Weights
Blast Furnaces	249	124	375	188
Brick	127	64	105	52
Building	732*	183	608	152
Carpets	31	8	23	6
Cars	424	106	571	143
Cotton Goods	393	98	412	103
Dyeing	48	36	52	39
Flour	40	10	45	11
Foundry and Machine Shop	362	90	483	121
Gas	44	22	43	22
Glass	75	19	78	20
Leather	56	14	72	18
Liquor	6	2	1	0
Lumber	480	240	364	182
Marble	55	28	32	16
Paper and Pulp	88	22	113	28
Planing	96	24	87	22
Rope	27	7	27	7
Shipbuilding	44	11	387	97
Slaughtering	99	50	161	80
Soap	14	4	20	5
Streets—Contract	74*	74	58	58
Streets—Municipal	74*	74	58	58
Tobacco	179	45	157	39
Petroleum	25	12	59	30
Boots and Shoes	192	48	211	53
Hosiery and Knit Goods	150	38	172	43
Silk	108	27	126	32
Wool	195	48	196	48

TABLE E—*Continued*

Industries	1914		1919	
	Wage earners	Weights	Wage earners	Weights
Automobile	127	32	343	84
Agricultural Implements	48	24	54	27
Electrical Apparatus	118	30	212	53
Chemicals	32	16	71	36
Fertilizer	23	12	26	13
Paint and Varnish	16	4	22	6
Paper Products	45	11	56	14
Printing and Publ.—Book & Job	113	28	123	31
Printing and Publ.—Newspaper	114	28	120	30
Furniture	128	32	138	34
Rubber	74	18	158	40
Cotton—North	230	58	220	55
Cotton—South	162	40	192	48

BIBLIOGRAPHY

While no pretence can be made at completeness, it is thought that the major collections of wage data by the federal government have been mentioned. Particular attention has been paid to data which either extend over a period of years or cover a particular industry or group of industries thoroughly at a particular time. Much scattering information cannot be included. Testimony before Congressional committees frequently contains many wage data of interest, but they are rarely in a form usable in a statistical study. Wage adjustment boards during the war form another source that has not been treated here and that would furnish figures of interest.

The divisions that are made in the citations that follow are not always exact, i. e., publications listed as wage studies occasionally contain some scattering original wage data, but on the whole the nature of the material covered is indicated by the division in which it is placed. References are given even though they do not contain unskilled wage data that have been used in the hope that they may be of use to others who are interested in wage data. The publications listed as wage studies are those which the author has found useful either because of their subject matter or because of their method of treatment of a particular problem.

I. Wage Data

A. Collected by the Federal Government[1]

1. *Collections including figures for various industries*

Secretary of the Interior, 35th Congress, 2nd session, Executive Document, no. 39, *Abstract of the Statistics of Manufactures according to the Returns of the 7th Census*, 1850, (1859).[2]

Secretary of the Interior, *8th Census of the United States, Manufactures*, 1860, pp. x, xi, xxii, lxxxvi, *et seq.*, (1865).[2]

Secretary of the Interior, *9th Census of the United States*, vol. iii, *Industry and Wealth*, 1870, pp. 392-746, (1872).[2]

[1] In the citations that follow the words, "United States", as part of the designation of authorship have been omitted, as has the place of publication, Washington. In each subdivision sources of data are recorded on a chronological basis. The year or years for which figures are given follow the title. The years in parentheses are those of publication.

[2] Total wages for industries and divisions with number of wage earners in each reported.

Department of the Interior, Census Office, *10th Census of the United States, Report on the Manufactures of the United States*, 1880, pp. 11-475, 745-768, 931, 1044-1045, (1883).[1]

Department of the Interior, Census Office, *10th Census of the United States, Report on the Statistics of Wages in the Manufacturing Industries*, Joseph D. Weeks, (1886). Waga data from 1880 to as far back as 1801 in a few instances.

Commissioner of Labor, *1st Annual Report*, pp. 143-166, 220-226, 295-410, (1886). Wages in 1885.

Department of the Interior, Census Office, *11th Census of the United States, Manufacturing Industries*, 1890, pt. i, table viii, pp. 653 *et seq.*, (1893).[1]

Congress, Senate, 52nd Cong., 1st Sess., Senate Report 986, *Report on Retail Prices and Wages*, 1889-1891, vol. i, pp. lx-lxxii; vol. iii, pp. 1902-2039, (1892).

Congress, Senate, 52nd Cong., 2nd Sess., Senate Report 1344, *Wholesale Prices, Wages and Transportation*, vols. i-iv, (1893). Aldrich Report presenting pay-roll transcripts, 1840-1891.

Commissioner of Labor, *7th Special Report, The Slums of Baltimore, Chicago, New York and Philadelphia*, 1893, pp. 212-501, (1894).

Department of Labor, *Bulletin 7*, "Rates of Wages Paid under Public and Private Contract," Ethelbert Stewart, pp. 728-753, (1896). Various occupations in Baltimore, Boston, New York and Philadelphia for 1895.

Commissioner of Labor, *11th Annual Report, Work and Wages of Men, Women and Children*, 1895-1896, (1897).

Commissioner of Labor, *9th Special Report, The Italians in Chicago*, 1896, pp. 52-273, 376-380, (1897).

Department of Labor, *Bulletin 10, Condition of the Negro in Various Cities*, 1896, pp. 304-332, (1897).

Commissioner of Labor, *13th Annual Report, Hand and Machine Labor*, pp. 474-1597, (1899). Wages in 1895 or 1896 compared with scattering earlier data.

Department of Labor, *Bulletin 18, Wages in the United States and Europe*, 1870-1898, pp. 670-682, (1898).

Commissioner of Labor, *15th Annual Report, A Compilation of Wages in Commercial Countries from Official Sources*, vols. i and ii, (1900). Data from many occupations in the United States and abroad for various years up to 1900. Valuable table of sources on pages 21-32. Secondary source.

[1] Total wages for industries and divisions with number of wage earners in each reported.

Department of Labor, *Bulletin 29, Trusts and Industrial Combinations,* Jeremiah Jenks, pp. 678-707, 766-812, (1900). Wages in various occupations, 1890-1900.

Department of the Interior, Census Office, *12th Census of the United States, Special Reports, Employees and Wages,* Davis R. Dewey, (1903). Wage figures for 1900 and 1890.

Commissioner of Labor, *18th Annual Report, Cost of Living and Retail Prices of Food,* pp. 264-285, (1904). Classified earnings groups by industries and occupations, 1901.

Commissioner of Labor, *19th Annual Report, Wages and Hours of Labor,* (1905). Wage tables for 519 occupations in 67 industries, 1890-1903.

Bureau of Labor, *Bulletin 59, Wages and Hours of Labor in Manufacturing Industries, 1890-1904,* pp. 1-147, (1905). Continues the *19th Annual Report* through 1904.

Bureau of Labor, *Bulletin 65, Wages and Hours of Labor in Manufacturing Industries, 1890-1905,* pp. 1-170, (1906). Continues the *19th Annual Report* through 1905.

Department of Labor and Commerce, Bureau of the Census, *Manufactures, 1905,* pts. i-iv, (1907-1908).[1]

Department of Labor and Commerce, Bureau of the Census, "Earnings of Wage-Earners" in *Special Reports of the Census Office, Manufactures, 1905,* pt. iv, pp. 641-813, (1908). Classified wage tables by industries and States, 1905.

Bureau of Labor, *Bulletin 71, Wages and Hours of Labor, 1890-1906,* pp. 1-174, (1907). Continues the *19th Annual Report* through 1906.

Bureau of Labor, *Bulletin 72,* "Italian, Slavic and Hungarian Unskilled Immigrant Laborers in the United States," Frank J. Sheridan, pp. 425-435, (1907). Wages in various industries 1905 and 1906.

Bureau of Labor, *Bulletin 77, Wages and Hours of Labor, 1890-1907,* pp. 1-180, (1908). Continues the *19th Annual Report* through 1907.

Immigration Commission, *Reports,* vols. i, vi-xxiii, (1911). Detailed information concerning wages of immigrants in industry. Volumes xix and xx contain a summary of the material. Volume i appeared as Senate Document 7, 61st Congress, 3rd Session, and volumes vi to xxiii as Senate Documents 68 to 85, 61st Congress, 2nd Session.

Department of Commerce, Bureau of the Census, *13th Census of the United States, Manufactures,* 1909, vols. viii-x, (1912-1913).[1]

Department of Commerce, Bureau of the Census, *Census of Manufactures,* 1914, vols. i and ii, (1918-1919).[1]

Department of Commerce, Bureau of the Census, *14th Census of the United States, Manufactures,* 1919, vols. viii-x, (1923).[1]

[1] Total wages for industries and divisions with number of wage-earners in each reported.

Bureau of Labor Statistics, *Bulletin 265, Industrial Survey in Selected Industries in the United States, Preliminary Report*, 1919, (1920).

Department of Commerce, Bureau of the Census, *Biennial Census of Manufactures*, 1921, (1924).[1]

Bureau of Labor Statistics, *Union Scale of Wages and Hours of Labor*, 1890 to 1912, *Bulletin 131*, (1913); *Bulletin 143*, 1913, (1914); *Bulletin 171*, 1914, (1915); *Bulletin 194*, 1915, (1916); *Bulletin 214*, 1916, (1917); *Bulletin 245*, 1917, (1918); *Bulletin 259*, 1918, (1919); *Bulletin 274*, 1919, (1920); *Bulletin 286*, 1920, (1921); *Bulletin 302*, 1921, (1922); *Bulletin 325*, 1922, (1923); *Bulletin 354*, 1923, (1924); *Bulletin 388*, 1924, (1925).

——, *Monthly Labor Review*. Invaluable source of reports of current wage data many of which appear later in a more detailed form in the *Bulletins* of the Bureau.

2. *Collections of Data for Single Industries*

a. *Agriculture*

Commissioner of Labor, *13th Annual Report, Hand and Machine Labor*, pp. 427-473, (1899). Wages in 1895 or 1896 compared with scattering earlier data.

Department of Agriculture, Miscellaneous Series, no. 26, *Wages of Farm Labor in the United States*, 1866-1902, James H. Blodgett, (1903).

Department of Agriculture, *Yearbook of the Department*.

b. *Boots and Shoes*

Bureau of Labor Statistics, *Wages and Hours of Labor in the Boot and Shoe and Hosiery and Knit Goods Industry, Bulletin 134*, 1890-1912, (1913).

——, *Wages and Hours of Labor in the Boot and Shoe and Hosiery and Underwear Industries, Bulletin 154*, 1913, (1914).

——, *Bulletin 178*,[2] 1914, (1915); *Bulletin 232*, 1916, (1917); *Bulletin 260*, 1918, (1919); *Bulletin 278*, 1920, (1921); *Bulletin 324*, 1922, (1923); *Bulletin 374*, 1924, (1925).

——, *Time and Labor Costs in Manufacturing 100 Pairs of Shoes, Bulletin 360*, 1923, (1924).

c. *Clothing*

Bureau of Labor Statistics, *Wages and Hours of Labor in the Boot and Shoe and Hosiery and Knit Goods Industry, Bulletin 134*, 1890-1912, (1913).

[1] Total wages for industries and divisions with number of wage-earners in each reported.

[2] Titles of Bulletins omitted where they repeat the heading of the division with no change.

——, *Wages and Hours of Labor in the Boot and Shoe and Hosiery and Underwear Industries, Bulletin 154*, 1913, (1914).

——, *Wages and Hours in the Cigar and Clothing Industries, Bulletin 135*, 1911 and 1912, (1913); *Bulletin 161*, 1913, (1914).

——, *Wages and Regularity of Employment in the Dress and Waist Industry of New York City, Bulletin 146*, 1912 and 1913, (1914).

——, *Wages and Regularity of Employment in the Cloak, Suit and Skirt Industry, Bulletin 147*, 1912 and 1913, (1914).

——, *Wages and Hours of Labor in the Hosiery and Underwear Industry, Bulletin 177*, 1914, (1915); *Bulletin 328*, 1922, (1923); *Bulletin 376*, 1924, (1925).

——, *Wages and Hours of Labor in the Men's Clothing Industry, Bulletin 187*, 1911-1914, (1916); *Bulletin 329*, 1922, (1923); *Bulletin 387*, 1924, (1925).

d. *Food*

Bureau of Labor Statistics, *Wages and Hours of Labor in the Slaughtering and Meat Packing Industry, Bulletin 252*, 1917, (1919); *Bulletin 294*, 1921, (1922); *Bulletin 373*, 1923, (1925).

e. *Iron and Steel*

Commissioner of Labor, *6th Annual Report, Cost of Production: Iron, Steel, Coal, etc.*, pp. 285-579, (1891). Wages in 1888-1889.

Bureau of Labor, *Bulletin 51, Wages Rates and Hours in Foundries*, 1903, (1904).

Senate Document 60, no. 521, 61st Cong., 2nd Sess., *Report on the Strike at Bethlehem Steel Works*, pp. 57-108, (1910). Wages in January, 1910 of employees of the Bethlehem Steel.

Senate Document 110, 62nd Cong., 1st Sess., *Report on Conditions of Employment in the Iron and Steel Industry*, vols. i-iii, (1911). Wage comparisons for the years 1900, 1905 and 1910.

Bureau of Labor Statistics, *Wages and Hours of Labor in the Building and Repairing of Steam Railroad Cars, Bulletin 137*, 1890-1912, (1913); *Bulletin 163*, 1913, (1914).

——, *Wages and Hours of Labor in the Iron and Steel Industry in the United States, Bulletin 151*, 1907-1912, (1914); *Bulletin 168*, 1913, (1915); *Bulletin 218*, 1915, (1917); *Bulletin 305*, 1920, (1922); *Bulletin 353*, 1922, (1924); *Bulletin 381*, 1924, (1925).

——, *Wages and Hours of Labor in Foundries and Machine Shops, Bulletin 362*, 1923, (1924).

f. *Lumber*

Commissioner of Labor, *White Pine Lumber in the United States and Canada*, Senate Document 70, 55th Cong., 1st Sess., pp. 6-26, (1897). Wages for years 1891-1896.

Bureau of Labor Statistics, *Wages and Hours of Labor in the Lumber, Millwork and Furniture Industries, Bulletin 129*, 1890-1912, (1913); *Bulletin 153*, 1913, (1914); *Bulletin 225*, 1915, (1917).

——, *Wages and Hours of Labor in Lumber Manufacturing, Bulletin 317*, 1921, (1923); *Bulletin 363*, 1923, (1924).

g. *Mines*

Anthracite Coal Strike Commission, *Report to the President*, Senate Document 6, 58th Cong., Spec. Sess., pp. 175-186, (1903). Wages in 1901 and 1902.

Bureau of Labor Statistics, *Hours and Earnings in anthracite and bituminous coal mining, Bulletin 279*, 1919 and 1920, (1921); *Bulletin 316*, 1921 and 1922, (1922).

United States Coal Commission, *Report*, 1923, pt. ii, pp. 315-495; pt. iii, pp. 1043-1257; pt. v, pp. 23-270, 305-480, (1925).

Bureau of Labor Statistics, *Wages and Hours of Labor in Metaliferous Mines, Bulletin 394*, 1924, (1925).

Reports of the Anthracite Board of Conciliation and of other governmental and semi-governmental bodies concerned with the coal industry.

h. *Telephone and Telegraph*

Senate Document 14, no. 725, 60th Cong., 2nd Sess., *Investigation of the Western Union and Postal Telegraph-Cable Companies*, pp. 42-50, 183-510, (1909). Wages in April, 1907 and 1908.

Senate Document 49, no. 380, 61st Cong., 2nd Sess., *Investigation of the Telephone Companies*, pp. 84-97, 128-131, 180-322, (1910). Detailed wage tables for one pay-roll period, 1908.

i. *Textiles*

Commissioner of Labor, *7th Annual Report, Cost of Production: The Textiles and Glass*, pp. 378 *et seq.* (1892). Wages in 1889.

Bureau of Labor Statistics, *Wages and Hours of Labor in the Cotton, Woolen and Silk Industries, Bulletin 128*, 1890-1912, (1913); *Bulletin 150*, 1913, (1914); *Bulletin 190*, 1914, (1916).

——, *Wages and Hours of Labor in Cotton Goods Manufacturing and Finishing, Bulletin 239*, 1916, (1918); *Bulletin 262*, 1918, (1919); *Bulletin 288*, 1920, (1921); *Bulletin 371*, 1924, (1925).

——, *Wages and Hours of Labor in Woolen and Worsted Goods Manufacturing, Bulletin 238*, 1916, (1918); *Bulletin 261*, 1918, (1919); *Bulletin 289*, 1920, (1921); *Bulletin 327*, 1922, (1923); *Bulletin 377*, 1924, (1925).

j. *Transportation*

Commissioner of Labor, *5th Annual Report, Railroad Labor*, pp. 75-881, (1890). Railroad wages in 1888.

Bureau of Labor, *Bulletin 57*, "Street Railway Employment in the United States," Walter E. Weyl, pp. 590-599, (1905). Wages in many cities, 1903.

Bureau of Labor Statistics, "*Street Railway Employment in the* United States," *Bulletin 204*, 1914, (1917).

Interstate Commerce Commission, *Statistics of Railroads in the United States.* Wages by occupational groups annually from the year ending June 30, 1892 through that ending June 30, 1921.

Interstate Commerce Commission, *Annual Reports of the Commission.* Average compensation per annum beginning with the year ending June 30, 1922.

Railroad Labor Board, *Wage Series.* Reports contain useful wage information since 1920.

k. *Miscellaneous Industries*

Bureau of Labor, *Bulletin 87*, "Wages and Hours of Labor of Union Carpenters in the United States and in English Speaking Foreign Countries," 1910, Ethelbert Stewart, pp. 583-593, (1910).

Bureau of Labor Statistics, *Wages and Hours of Labor in the Petroleum Industry, Bulletin 297*, 1920-1921, (1922).

——, *Productivity Costs in the Common-Brick Industry, Bulletin 356*, 1922-1923, (1924).

——, *Wages and Hours of Labor in the Automobile Industry, Bulletin 348*, 1923, (1923).

——, *Wages and Hours of Labor in the Automobile Tire Industry, Bulletin 358*, 1923, (1924).

——, *Wages and Hours of Labor in the Paper and Pulp Industry, Bulletin 365*, 1923, (1925).

Tariff Commission, *Tariff Information Series.* Reports of the Commission on specific industries usually contain wage figures.

3. *Wages of Women and Children*

Commissioner of Labor, *4th Annual Report, Working Women in Large Cities*, pp. 67-71, 484-625, (1889). Wages in 1887.

Senate Documents 86-104, 61st Cong., 2nd Sess., *Women and Children Wage-Earners*, 1907-1908, vols. i-v, ix, xii, xviii, (1909-1910).

Women's Bureau, *Bulletins 4, 17, 21, 22, 25, 26, 29, 30, 32, 34, 35, 37, 44, 47, 48* contain data concerning women's wages in various industries in certain sections of the country.

Children's Bureau, *Bulletins 89, 100, 106, 115, 117, 126, 130* contain wage statistics for children or adults or both in various occupations.

B. COLLECTED BY THE STATES

Various types of wage data collected by the bureaus of labor of the following States have been found useful:

California	Massachusetts	South Carolina
Connecticut	New Jersey	Wisconsin
Illinois	Ohio	Washington
Iowa	Pennsylvania	

The reports of minimum wage commissions and boards of those States which have had minimum wage laws contain much that is of use. Special State reports of which the New York State Factory Investigating Commission (1914-1915) is a notable example have often much of interest to the student of wage changes.

C. COLLECTED BY PRIVATE ORGANIZATIONS OR INDIVIDUALS

Manufacturers' Associations and Labor Unions form the two chief unofficial sources of wage information. The student of wage changes in a particular industry will find that if either group is organized much information of a rather mixed value can be secured. Trade journals and labor union publications frequently contain reports of wage scales in the industry or trade concerned. The two following collections of wage information, the first of which was issued under the auspices of an organization for scientific research and the second by an organization of manufacturers are the most useful of the recent unofficial studies containing source data:

King, W. I., *Employment, Hours and Earnings in Prosperity and Depression*, (New York, 1923).

National Industrial Conference Board, *Wages and Hours in American Industry*, (New York, 1925). Earlier wage reports of this organization published as its *Research Reports 20, 31, 35, 45, 52, 59*, and *62*.

II. Studies of Wage Data and Methodology

Abbott, Edith, "Statistics of Wages in the 12th Census," in *Journal of Political Economy*, vol. xii, pp. 339-361, (1904).

——, "The Wages of Unskilled Labor in the United States," in *Journal of Political Economy*, vol. xiii, pp. 321-367, (1905).

Berridge, William A., "An Index of the Incomes of Factory Workers in the United States," in *Purchasing Power of the Consumer*, pp. 1-120, (Chicago, 1925).

Bowley, A. L., "Comparison of the Rates of Increase of Wages in the United States and in Great Britain," in *Economic Journal*, vol. v, pp. 369-383, (1895).

——, "Changes in Average Wages (Normal and Real) in the United Kingdom between 1860 and 1891," in *Journal of the Royal Statistical Society*, vol. lviii, pp. 223-285, (1895).

——, "Comparison of the Changes in Wages in France, United States and the United Kingdom from 1840 to 1891," in *Economic Journal*, vol. viii, pp. 474-489, (1898).

——, "Wages in the United States and Europe," in *Economic Journal*, vol. ix, pp. 136-140, (1899).

——, *Wages in the United Kingdom during the Nineteenth Century*, (Cambridge, 1900).

——, "A Suggestion for the International Comparison of Wages by the Use of the Median," in *Bulletin de l'Institut International de Statistique*, vol. xviii, pp. 552-553, (1910).

——, *The Division of the Product of Industry*, (Oxford, 1919).

——, *Prices and Wages in the United Kingdom, 1914-1920*, (Oxford, 1921).

Bullock, Charles J., "Contributions to the History of Wage Statistics," in *Publications of the American Statistical Association*, vol. vi, pp. 187-218, (1899).

Bureau of Applied Economics, *Bulletin 8, Wages in Various Industries and Occupations, 1914-1920*, (Washington, 1920).

Burgess, W. Randolph, "Index Numbers for the Wages of Common Labor," in *Publications of the American Statistical Association*, vol. xviii, pp. 101-103, (1922).

Diener, Richard, *Das Problem der Arbeitspreisstatistik und seine Lösung mit Hilfe von Berufssterblichkeits- und Lohnstatistik*, (München, 1915).

Douglas, Paul H., "Wages and Hours of Labor in 1919," in *Journal of Political Economy*, vol. xxix, pp. 78-80, (1921).

——, "An Examination of the Wage Studies of the National Industrial Conference Board," in *Publications of the American Statistical Association*, vol. xvii, pp. 893-904, (1921).

——, "Movement of Wages and the Future of Prices," in *Proceedings of the American Academy of Political and Social Science*, vol. xi, pp. 238-246, (1925).

——, "The Movement of Real Wages and its Economic Significance," in *American Economic Review*, vol. xvi, Suppl., pp. 17-53, (1926).

Douglas, Paul H. and Lamberson, Frances, "The Movement of Real Wages, 1890-1918," in *American Economic Review*, vol. xi, pp. 409-426, (1921).

Eaton, Isabel, "Receipts and Expenditures of Certain Wage-earners in the Garment Trades," in *Publications of the American Statistical Association*, vol. iv, pp. 135-180, (1895).

Fairchild, H. P., "The Standard of Living—Up or Down," in *American Economic Review*, vol. vi, pp. 9-25, (1916).

Falkner, R. P., "Wage Statistics in Theory and Practice," in *Publications of the American Statistical Association*, vol. vi, pp. 275-289, (1899).

Fisher, Irving, *The Making of Index Numbers*, (Boston, 1923).

Flinn, Richard A., "A Statistical Index of the Purchasing Power of

Consumers in the United States," in *Purchasing Power of the Consumer*, pp. 279-312, (Chicago, 1925).

Gulick, Charles A., *Labor Policy of the United States Steel Corporation*, pp. 58 *et seq.*, (New York, 1924).

Hanna, Hugh S. and Lauck, W. Jett, *Wages and the War*, (Cleveland, 1918).

Hansen, Alvin H., "The Outlook for Wages and Employment," in *American Economic Review*, vol. xiii, Suppl., pp. 27-44, (1923).

——, "Factors Affecting the Trend of Real Wages," in *American Economic Review*, vol. xv, pp. 27-42, (1925).

——, "The Best Measure of Real Wages," in *American Economic Review*, vol. xvi, Suppl., pp. 5-16, (1926).

Heisz, C., "Le Salaire et la Condition des Ouvriers aux Etats-Unis d'Amerique," in *Revue Economique internationale*, vol. iii, pp. 558-598, (1906).

Howard, S. E., *The Movement of Wages in the Cotton Manufacturing Industry of New England since 1860*, (Boston, 1920).

Hutchinson, Emile J., *Women's Wages*, (New York, 1919).

James, A. E., "The Dewey Report on Wages in the Manufacturing Industries of the United States," in *Publications of the American Statistical Association*, vol. x, pp. 317-344, (1907).

James, F. W., "Real Wages in Recent Years," in *American Economic Review*, vol. vii, pp. 319-330, (1917).

Kennedy, J. C. and others, *Wages and Family Budgets in the Chicago Stockyards District*, (Chicago, 1914).

King, W. I., *Wealth and Income of the People of the United States*, pp. 163 *et seq.*, (New York, 1915).

Kuczynski, Robert R., *Arbeitslohn und Arbeitszeit in Europa und Amerika, 1870-1909*, (Berlin, 1913).

Lawrence, F. W., *Local Variations in Wages*, (London, 1899).

Lennard, Reginald, *Economic Notes on English Agricultural Wages*, (London, 1914).

Levasseur, E., (Adams, Thomas S., translator), *The American Workman*, pp. 276 *et seq.*, (Baltimore, 1900).

Lewis, E. Llewelyn, *The Children of the Unskilled*, (London, 1924).

Liggett, Hazal M., *The Relation of Wages to the Cost of Living in Los Angeles*, 1915 to 1920, (Los Angeles, 1921).

Mayo-Smith, Richmond, "Statistics of Wages in the Next United States Census," in *Quarterly Journal of Economics*, vol. ii, pp. 385-413, (1888).

Mitchell, Wesley C., *History of the Greenbacks*, (Chicago, 1903).

——, "Methods of Presenting Statistics of Wages," in *Publications of the American Statistical Association*, vol. ix, pp. 325-343, (1905).

——, *Gold, Prices and Wages under the Greenback Standard*, (Berkeley, 1908).

——, *Business Cycles*, pp. 130-139, (Berkeley, 1913).

Mitchell, W. C., King, W. I., Knauth, O. W. and Macaulay, F. R., *Income in the United States, 1909-1919*, vol. i, (New York, 1921); vol. ii, (New York, 1922).

Moore, Henry L., "The Efficiency Theory of Wages," in *Economic Journal*, vol. xvii, pp. 571-579, (1907).

——, "The Variability of Wages," in *Political Science Quarterly*, vol. xxii, pp. 61-73, (1907).

——, *Laws of Wages*, (New York, 1911).

National Industrial Conference Board, *Railway Wages and Working Rules*, (New York, 1922).

——, *Wages, Hours and Employment of Railroad Workers*, (New York, 1924).

Nearing, Scott, *Wages in the United States*, (New York, 1910).

——, "Wages in Massachusetts and New Jersey," in *Publications of the American Statistical Association*, vol. xiii, pp. 157-173, (1912).

——, "Wages in the United States," in *Annals of the American Academy of Political and Social Science*, vol. xlviii, pp. 41-44, (1913).

——, "Adequacy of American Wages," in *Annals of the American Academy of Political and Social Science*, vol. lix, pp. 111-124, (1915).

New York City, Bureau of Standards, *Report on the Cost of Living of an Unskilled Laborer's Family in New York City*, 1915, (New York, 1915).

Ogburn, W. F., "Measurement of the Cost of Living and Wages," in *Annals of the American Academy of Political and Social Science*, vol. lxxxi, pp. 110-122, (1919).

Ogburn, W. F. and Kelly, E., "Wages in American Cities," in *Publications of the American Statistical Association*, vol. xv, pp. 313-317, (1916).

Quarterly Journal of Economics, vol. xiii, pp. 105-109, "Recent Statistics of Wages," (1898).

——, vol. xiii, pp. 233-235, "Statistics of Average Wages," (1899).

Rawson, S. W., "War and Wages in the Iron, Coal and Steel Industries," in *Economic Journal*, vol. xxvi, pp. 174-182, (1916).

Rubinow, I. M., "The Recent Trend of Real Wages," in *American Economic Review*, vol. iv, pp. 793 *et seq.*, (1914).

——, "Present Trend of Real Wages," in *Annals of the American Academy of Political and Social Science*, vol. lxix, pp. 28-33, (1917).

Secrist, Horace, "Use of Averages in Expressing the Wages and Hours of Milwaukee Street Car Trainmen," in *Publications of the American Statistical Association*, vol. xiii, pp. 279-297, (1912).

Spahr, Charles B., *An Essay on the Present Distribution of Wealth in the United States*, (New York, c. 1896.)

Stecker, M. L., "Wage Studies of the National Industrial Conference Board: A Reply," in *Publications of the American Statistical Association*, vol. xviii, pp. 258-266, (1922).

Streightoff, Frank H., *The Standard of Living among the Industrial People of the United States*, (Boston, 1911).

Van Kleeck, Mary, "Effect of Unemployment on the Wage Scale," in *Annals of the American Academy of Social and Political Science*, vol. lxi, pp. 90-102, (1915).

Walling, W. E., "The New Unionism—The Problem of the Unskilled Worker," in *Annals of the American Academy of Political and Social Science*, vol. xxiv, pp. 296-315, (1904).

Winslow, Emma A., "Contributions from Budget Studies to the Construction of a Statistical Index of the Purchasing Power of Consumers in the United States," in *Purchasing Power of the Consumer*, pp. 123-277, (Chicago, 1925).

Woods, E. B., "Have Wages Kept Pace with the Cost of Living," in *Annals of the American Academy of Political and Social Science*, vol. lxxxix, pp. 135-147, (1920).

Wright, C. D., "Evolution of Statistics of Wages," in *Quarterly Journal of Economics*, vol. vi, pp. 151-189, (1892).

——, "The Course of Wages in the United States since 1840," in *Publications of the American Statistical Association*, vol. iii, pp. 496-500, (1893).

LIBRARY
SCHOOL OF BUSINESS

INDEX

Abbott, Edith, on wages of unskilled, 27, 34-35
Actual earnings in wage reports, 31
Actual earnings and full-time wages, 39
Aggregative, weighted, 91-96
Agricultural implements industry, wage data, 141
Agriculture, proportion of unskilled, 18-19; wages, 23, 32, 102-104, 108, 110
Aldrich Report, 26, 34-36
Annual description of wage conditions, 28
Annual income of unskilled, 124
Apprentices in unskilled group, 17
Arithmetic mean, 40-42
Automobile industry, wage data, 29, 141
Automobile tire industry, wage data, 29
Averages, types of, 40-42
Average wage, validity of, 80-87

Bar mills, *see* Iron and Steel
Bessemer Converters, *see* Iron and Steel
Blast furnaces, wage data, 49-51, 127-136; *See also* Iron and Steel
Blast furnaces, hourly wage distribution, 77
Bleachhouse laborers, wage data, 55-58; *see also* Dyehouse laborers
Bowley, Arthur L., definition of unskilled labor, 15
Boot and shoe industry, wage data 29, 75, 137-141
Brick industry, wage data, 62, 127-136
Business statistics, 11
Bureau of Applied Economics, wages studies, 33
Building industry, wage data, 58-61, 127-136

Car building, wage data, 29, 42-49, 127-138; hourly wage distribution, 80
Carpet industry, wage data, 68, 127-136
Census figures of wages, 22-27
Chain relative, 89-96
Changes in data indicated by mean, 41-42
Chemical industry, wage data, 141
Child wage-earners, 28
Choice of data, 47
Cigar industry, wage data, 29
City life, effect on unskilled, 123, 125
Classification of skilled and unskilled, 13-17
Classified tables in wage reports, 27, 31
Clothing industry, wage data, 29
Coke industry, special report in 10th Census, 24
Collective bargaining among the unskilled, 13
Comparability of wage data, 44-47
Competitor, unskilled laborer as a, 102
Computation of an index of unskilled wages, 87-96
Congressional investigations of wages, 32
Consumption, changed standards of, 123-124
Cost of living, measurement of, 112-118
Cotton industry, wage data, 29, 55-58, 74-75, 127-141; wage study by S. E. Howard, 36
Cross weight aggregative, 91-96
Cumulative percentage tables of wages, 25
Curve of error, 40
Cyclical changes, effect on wage figures, 38-39

Dependents, changes in number, 122
Description of unskilled labor, 13-17
Deviation, average or standard, 42, 81-82

Dewey, Davis R., *Employees and Wages*, 25
Distilled liquor industry, wage data, 63-64, 127-133
Distribution of wage rates around averages, 77-84
Douglas, Paul H., food prices, 115-117
Dyehouse labor, wage data, 55-58, 127-136

Educational situation, related to the unskilled group, 13
Edwards, Alba M., proportion of unskilled, 18
Electrical apparatus industry, wage data, 141
Employees and Wages, 25
Excavating, wages for, 33
Exclusion of wage quotations, 41

Families, changes in size, 122
Farm laborers, wage data, 23, 102-104, 110
Federal department of labor, 12; *see also* Labor, department, bureau, or commissioner of
Fertilizer industry, wage data, 141
Flour industry, wage data, 62-63, 127-136
Fluctuations in money wages of unskilled, 97-101
Food, importance in total cost of living, 113
Formulae of index numbers, 91
Foundries, wage data, 29, 63, 127-136, 141
Full-time earnings, use of, 30; and actual earnings, 39; effect on data in years of depression, 121-122
Furniture industry, wage data, 29, 141

Gainfully employed, change in numbers, 122
Gas industry, wage data, 63-64, 127-136
Glass industry, special report in the 10th Census, 24; wage data, 63-64, 127-136
Government expenditure, 125
Government wages of unskilled labor, 66-68, 127-136
Gulick, Charles A., wages in United States Steel Corporation, 107

Hansen, Alvin H., cost-of-living index, 115-120
Health and strength, qualifications of unskilled, 17
Helpers in the unskilled group, 17
Hosiery industry, wage data, 29, 75, 137-141
Hourly wage rates and weekly wages, 39
Hours of labor, changes in, 125
Howard, S. E., wages in the cotton industry, 36

Immigration Commission, 32
Inadequacy of data for certain years, 94
Inclusion of wage data, 37
Index of unskilled wages, 1860-1891, 35; 1890-1924, 96-101
Index numbers of wages, value of, 78-87; formulae, 91
Industrial wage surveys of the Bureau of Labor Statistics, 28
Interstate Commerce Commission, 32, 104-106, 111
Iron and steel industry, special report in 10th Census, 24; Bethlehem Steel Works, 28, 32; wages in United States Steel Corporation, 106-108, 110; wage data, 28-29, 32, 137-141; *see also* Blast furnaces
Iron mines of Minnesota, 28

Knit-goods industry, wage data, 29, 75, 137-141

Labor costs, figures of, 22-23
Labor, Commissioner of, 27, 37-38; Department of, Aldrich report, 26
Labor Statistics, Bureau of, wage reports, Chapter II; retail price indexes, 113-116
Laborers constituting most important unskilled group, 16
Lamberson, Frances, retail food prices, 115-117
Lewis, E. Llewelyn, definition of unskilled labor, 14-15
Leather industry, wage data, 69, 127-136, 141
Logarithmic charts, 100, 110, 111
Lowest paid group as unskilled, 15-16
Lumber industry, hourly wage distribution, 79; wage data, 29, 52-55, 127-141

Machine shops, wage data, 29, 141
Manufacturing, proportion of unskilled, 18-20; special report in 10th Census, 24; industrial representation in National Industrial Conference Board wage reports, 33
Marble industry, wage data, 64, 127-136
Marshall, Alfred, proportion of unskilled, 17
Massachusetts wage figures, 32
Mean, arithmetic, 40-42
Meat-packing industry, wage data, 29, 127-136, 141
Median, 25, 40-41
Millwork, wage data, 29, 52, 137-139, 141
Mining, proportion of unskilled, 18
Mitchell, Wesley C., wage studies, 36
Mode, 40-41
Money wages of the unskilled, 96-101, 110
Municipalities, wages paid by, 66-68, 127-136

National Industrial Conference Board, definition of unskilled labor, 14; wage reports, 32; data used, 94-96; report on railroad wages, 105; wage figures, 141
Nearing, Scott, proportion of unskilled, 17
New York wage figures, 32
Normal level of wages, 38-39
Numerical importance of unskilled labor, 13

Occupations designated as unskilled, 15-16
Open-hearth furnaces, *see* Iron and steel
Organization of unskilled, 13

Paint and varnish industry, wage data, 141
Paper and pulp industry, wage data, 29, 64-65, 127-136, 141
Planing, wage data, 52-55, 127-136, 141
Practical wage observations, errors of, 12
Printing and publishing, wage data, 141
Proportion of unskilled in total employed, 17-20
Psychic income, 125
Puddling mills, *see* Iron and steel

Qualifications of unskilled, 17
Quantitative methods of economic research, 11
Quartiles in wage studies, 25

Railroad workers, wage data, 32, 104-106, 111
Range of wage quotations, 25, 41-42
Real wages of unskilled labor, 112-125; method of computing, 112-119
Reasons for study of unskilled wages, 13
Reduction in wages, effect on unskilled, 13, 124
Regularity of employment, 123
Representative wage figures, 43-44
Rising prices, effect on consumption, 124
Road laborers, wage data, 33, 108-109, 111
Rope industry, wage data, 65, 127-133
Rubber industry, wage data, 141

Salaried workers, inclusion in census wage data, 23
Sampling, in 1919 survey, 31; adequacy of 44-46; validity of the mean, 85-86
Seasonal unemployment, effect on wage figures, 38-39
Semi-logarithmetic charts, 100, 110, 111
Sheet mills, *see* Iron and steel
Shipbuilding industry, wage data, 65, 127-136
Silk industry, special report in 10th Census, 24; wage data, 29, 55-56, 137-138, 141
Similarity in the trends of unskilled wages, 109
Slaughtering industry, wage data, 29, 65-66, 127-136, 141
Soap industry, wage data, 65, 127-133
Social expenditure, 125
Specialized unskilled labor, 49-50
Standard deviation, in wage studies, 42; comparison for two years, 81-82

Standard rail mills, *see* Iron and steel
Steel, *see* Iron and Steel
Street work, wage data, 66-68, 127 136
Survey of wages, 1919, 30

Telegraph industry, 28
Telephone industry, 32
Territory covered by wage surveys, 26-27
Textiles, wage data, 55-58
Textile workers, Lawrence, Mass., 28
Theoretical conclusions contrasted with *practical* observations, 12
Tin plate, *see* Iron and steel
Total number employed compared with number of unskilled, 17-20
Tobacco industry, wage data, 69, 127-133
Trade publications, wage data, 33
Training of unskilled on the job, 14
Transfer of labor, a criterion of skill, 14
Transportation, porportion of unskilled, 18-20

Unemployment, effect on unskilled, 13; reflected in wage figures, 121-122
Union scale of wages and hours, 30, 59-60
United States Steel Corporation, wages of unskilled, 106-108, 110
Unrelated data, method of fitting together, 89-90
Unskilled labor, description of, 13-17
Unspecialized work, a criterion of unskilled labor, 15
Urbanization, effect on unskilled, 123, 125

Variations in cost-of-living figures, 117-118

Wage data, value of continuous, 22
Wage movements, general facts, 12
Wages of unskilled, average weekly, 127-141
Walling, W. E., proportion of unskilled, 17
War Industries Board, 30
Weekly wages and hourly wage rates, 39
Weeks, Joseph D., wage reports in 10th Census, 24
Weighting, methods, 46-47, 87-89
Weights used in index of wages, 142-145
Women wage earners, 28
Wool and worsted industry, hourly wage distribution, 78; wage data, 29, 56-58, 71, 137-141

VITA

THE author was born on January 4, 1897. He entered Bowdoin College in 1914 after receiving his early education in the schools of East Orange, New Jersey. He was graduated from Bowdoin College with the degree of A.B. in 1919. In the same year he studied at the London School of Economics for a short time. His work at Columbia University commenced in 1920. The following year he received the degree of M.A. He remained in residence through the academic year 1921-1922. During that year he attended the seminar conducted by Professors Seligman, Seager and Simkhovitch. He was instructor in Economics at Lake Forest College from 1922 to 1925. In the summer of 1925 he was editor of publications for the Illinois Department of Labor, editing the annual report of the department and the *Labor Bulletin.* During the year 1925-1926 he has been Assistant Professor of Economics at Allegheny College. He is publishing with Albert R. Ellingwood in 1926 an edited textbook entitled *The Government and Labor.*